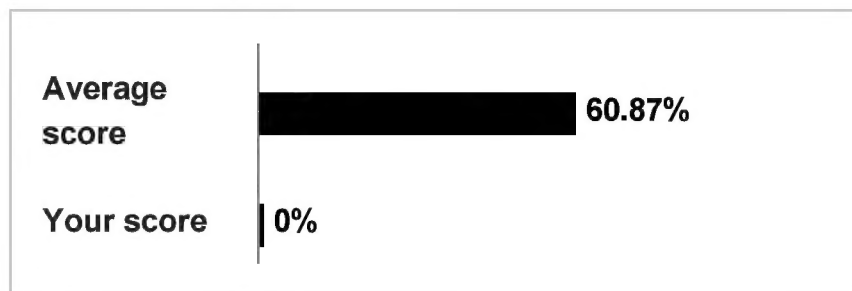


# Medicine Quiz 6

## Medicine Quiz 6

### Results

- ✔ 0 of 50 questions answered correctly
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Answered   Review

1. Question

1 points

A 65-year-old male comes to the emergency department because of a sudden, painless loss of vision in his right eye that occurred a half an hour ago. Five hours ago, he experienced a similar but transient loss of vision in the same eye, which lasted for five minutes. He has hypertension, diabetes, hypercholesterolemia, and peripheral vascular disease. He had an anterior wall myocardial infarction six years ago. His medications include glyburide, captopril, atenolol, simvastatin and aspirin. His temperature is 36.7 °C (98.0 °F), respirations are 16/min, pulse is 88/min, and blood pressure is 146/88 mm Hg. Examination of the right eye reveals visual acuity of 20/60 and subtle retinal whitening. A right carotid bruit is heard. Which of the following is the most appropriate next step in the management of this patient?

1. ☐ Acetazolamide IV
2. ☒ Ocular massage and high flow oxygen ✓
3. ☐ Administer systemic steroids
4. ☐ Instillation of topical  $\beta$ -blocker
5. ☐ Administer thrombolytics

**INCORRECT** ✗

**The correct answer is 2.**

The most likely diagnosis is central retinal artery occlusion (CRAO) secondary to embolism. Painless loss of monocular vision is the usual presenting symptom. Risk factors include carotid artery disease, endocarditis, cardiac valvular disease, long bone fracture, hypercoagulable conditions, vasculitis, atrial myxoma, etc. It occurs when a severe, abrupt diminution of blood flow through the central retinal artery causes ischemia of the inner retina. (Remember that the ophthalmic artery is the first intracranial branch of the internal carotid artery. It supplies blood to the eye via the (1) central retinal artery, which is an end artery that supplies the inner retina, and the (2) ciliary branches, which supply the choroids and anterior portion of globe). Embolism of the retinal artery is the most common cause of ocular stroke. Emboli may travel to the distal branches of the retinal artery, causing loss of only a section of the visual field. It is commonly associated with amaurosis fugax before the occlusion (as in this patient). Visual acuity is typically 20/800 (6/240) or worse. Fundoscopy reveals diffuse ischemic retinal whitening and cherry red spots (typical but not specific for CRAO). CRAO is an ophthalmologic emergency. A delay in treatment may result in permanent loss of vision. Immediate intervention includes ocular massage, which dislodges the embolus to a point further down the arterial circulation and improves retinal perfusion. Medical management and anterior chamber paracentesis to lower the intraocular pressure may be used, but ocular massage has the most rapid action. Carbogen therapy (5 % CO<sub>2</sub> and 95% O<sub>2</sub>) or hyperbaric oxygen (HBO) therapy have been shown to be beneficial if given early.

**(Choices 1 & 4)** Acetazolamide and  $\beta$ -blockers are used in the management of acute angle closure glaucoma, which is characterized by a sudden, painful loss of vision with red eye.

**(Choice 3)** Systemic steroids are used in the management of vision loss associated with temporal arteritis; however, this patient has no signs suggestive of temporal arteritis.

**(Choice 5)** Thrombolytics may be useful if initiated within 4-6 hours of visual loss; however, ocular massage is performed first because it is a rapid and effective intervention.

## 2. Question

1 points

A 26-year-old male complains of itching and excessive watering of both eyes since this morning. He denies blurring of vision. He uses albuterol inhaler regularly for his bronchial asthma. His vital signs are normal. On examination, both eyes are noted to have conjunctival edema, hyperemia, swollen eyelids, and profuse watery discharge. What is the most likely diagnosis?

1. ☐ Atopic keratoconjunctivitis
2. ☒ Allergic conjunctivitis ✓
3. ☐ Toxic conjunctivitis
4. ☐ Blepharitis
5. ☐ Dacryocystitis.

**INCORRECT** ✗

**The correct answer is 2.**

Allergic conjunctivitis is an acute hypersensitivity reaction that is caused by environmental exposure to allergens. Intense itching, hyperemia, tearing, and conjunctival edema and eyelid edema are

characteristic. Some patients complain of photophobia and a burning sensation. There is usually a family or personal history of asthma (as in this patient), seasonal rhinitis, atopic dermatitis, food allergies, and urticaria. The condition usually subsides in 24 hours, even without treatment. Reducing exposure to allergens can prevent conjunctivitis. Patients should be advised to never rub their eyes and to use topical antihistamines, artificial tears, and cool compresses.

**(Choice 1)** Atopic keratoconjunctivitis is a severe form of ocular allergy. The most common symptom is itching, tearing, thick mucus discharge, photophobia, and blurred vision. Usually, visual disturbances do not occur with allergic conjunctivitis.

**(Choice 3)** Toxic conjunctivitis occurs due to direct damage to ocular tissues from drugs. It happens with prolonged use of the offending agent. A history of using aminoglycoside antibiotics, glaucoma drops, artificial tears, or contact lens solution can be elicited in patients.

**(Choice 4)** Blepharitis is a chronic inflammatory condition involving the lid margins bilaterally. Crusty discharge is seen clinging to the lashes in anterior blepharitis, whereas hyperemic lid margins with telangiectasias are seen in posterior blepharitis.




**(Choice 5)** Dacryocystitis is an infection of the lacrimal sac due to obstruction of the nasolacrimal duct. It is characterized by pain, swelling, tenderness, and redness in the tear sac area. Mucous or pus can be expressed.

### 3. Question

1 points

A 4-year-old boy is brought by his mother to a Medical Camp for the Uninsured for the evaluation of his inflamed right eye. He has had a nasal discharge for the past 10 days. His brother has similar symptoms. His vital signs are stable. There are follicles and inflammatory changes in the conjunctiva of his right eye. The cornea shows neovascularization. What is the most likely diagnosis?

1. ☐ Herpes simplex keratitis
2. ☐ Orbital cellulitis
3. ☒ Trachoma 
4. ☐ Gonococcal conjunctivitis
5. ☐ Viral conjunctivitis

**INCORRECT** 

**The correct answer is 3.**

Trachoma is caused by *Chlamydia trachomatis* serotype A-C. It is a major cause of blindness worldwide. The active phase of the disease is characterized by follicular conjunctivitis and pannus (neovascularization) formation in the cornea. Concurrent infection occurs in the nasopharynx, leading to nasal discharge. The diagnosis can be made by Giemsa stain examination of conjunctival scrapings. Oral tetracycline or erythromycin should be started immediately. Repeated infections can lead to scarring of the cornea.

**(Choice 1)** Herpes simplex keratitis presents as pain, photophobia, and decreased vision. Dendritic ulcer is the most common presentation. There may also be minute clear vesicles in the corneal epithelium.

**(Choice 2)** Orbital cellulitis refers to an infection that is posterior to the orbital septum. These infections are unilateral and more common in children with paranasal sinus infection. Patients present with an abrupt onset of fever, proptosis, restriction of extraocular movements and swollen, red eyelids.

**(Choice 4)** Gonococcal conjunctivitis is acquired through contact with infected genital secretions, and occurs 2-3 days after birth. It presents as copious, purulent eye discharge with swollen eyelids and chernosis.

**(Choice 5)** In viral conjunctivitis, the conjunctiva is red with copious, watery discharge. Children are more commonly infected through contaminated swimming pools. It is mostly caused by adenovirus type 3.

#### 4. Question

1 points

A 60-year-old woman comes to the emergency department due to a sudden onset of severe pain in her left eye with blurred vision, nausea, and vomiting. The symptoms began a few minutes ago, while she was watching a movie in a nearby theater. Her blood pressure is 140/90 mm Hg, pulse is 82/min, respirations are 14/min, and temperature is 98.4 °F. Examination reveals decreased visual acuity. Her left eye appears red, with a hazy cornea, shallow anterior chamber, and dilated, fixed pupil. Her left eye is stony hard to touch. What is the most likely diagnosis?

1. ☐ Primary open angle glaucoma
2. ☐ Conjunctivitis
3. ☒ Acute angle closure glaucoma ✓
4. ☐ Anterior uveitis
5. ☐ Corneal abrasion

**INCORRECT** ✗

**The correct answer is 3.**

Angle closure glaucoma occurs with closure of a pre-existing narrow anterior chamber angle. It predominantly occurs in people aged 55- 70 years. It presents with an acute onset of severe eye pain and blurred vision associated with nausea and vomiting. It usually occurs following pupillary dilation, which may occur in darkened movie theaters, during times of stress, or due to drug intake. Examination reveals a red eye with steamy cornea and moderately dilated pupil that is non reactive to light. The anterior chamber is shallow with inflammatory changes. Tonometry reveals increased intraocular pressure. Intravenous acetazolamide (with subsequent oral administration) may lower the intraocular pressure. Permanent cure is offered with laser peripheral iridotomy.

**(Choice 1)** Open angle glaucoma has an insidious onset, with gradual loss of peripheral vision resulting in tunnel vision. Other characteristic features are persistently increased intraocular pressure and pathologic cupping of the optic disc.

**(Choice 2)** Conjunctivitis is characterized by very mild pain. The cornea is clear. Pupillary size and response to light is normal. Visual acuity is not affected.

**(Choice 4)** Uveitis presents with moderate pain and blurred vision. Cornea may be hazy. The anterior chamber shows flare and cells on slit lamp examination. The pupil is constricted with a poor light response (In acute glaucoma, the pupil is dilated and is nonreactive to light).

**(Choice 5)** Corneal abrasion presents with severe pain and photophobia. There is usually a history of trauma to the eye. Slit lamp examination with fluorescein will reveal the corneal abrasion.

## 5. Question

1 points

A 32-year-old male construction worker presents with complaints of pain, watering, and redness in his left eye for the past 2 days. He reports having similar symptoms in the same eye a few months ago. Examination of his left eye reveals vesicles and dendritic ulcers in the cornea. His vital signs are stable. What is the most likely diagnosis?

1. ☐ Bacterial retinitis
2. ☒ Herpes simplex keratitis ✓
3. ☐ Herpes zoster ophthalmicus
4. ☐ Corneal abrasion
5. ☐ Fungal keratitis

**INCORRECT** ✗

**The correct answer is 2.**

Herpes simplex keratitis is a frequent cause of corneal blindness. It mostly occurs in adults. These patients usually complain of pain, photophobia, blurred vision, tearing, and redness. A history of prior episodes may be present. Usually, the recurrences are precipitated by excessive sun exposure, outdoor occupation (as in this patient), fever, or immunodeficiency. Corneal vesicles and dendritic ulcers are characteristic. Dendritic ulcers are the most common presentation. It is primarily diagnosed clinically, although epithelial scrapings will show multi-nucleated giant cells. Antiviral therapy (oral or topical) is effective in the treatment of Herpes simplex keratitis.

**(Choice 1)** Bacterial keratitis usually occurs in contact lens wearers, following corneal trauma or entry of a foreign body. The cornea appears hazy with a central ulcer and adjacent stromal abscess. Hypopyon may be present.

**(Choice 3)** Herpes zoster ophthalmicus is an infection caused by varicella-zoster virus. Most episodes occur in the elderly. It presents with fever malaise and a burning, itching sensation in the periorbital

region. Examination reveals a vesicular rash in the distribution of the cutaneous branch of the first division of the trigeminal nerve. Conjunctivitis and dendriform corneal ulcers characterize the eye involvement.

**(Choice 4)** Corneal abrasion presents with severe pain and photophobia. There is usually a history of trauma to the eye. Slit lamp examination reveals corneal abrasion.




**(Choice 5)** Fungal keratitis occurs after corneal injury in agricultural workers or immunocompromised patients. The cornea shows multiple stromal abscesses.

## 6. Question

1 points

A 30-year-old male comes to the emergency department screaming, "Something blew into my right eye while I was drilling!" He complains of a foreign body sensation in the right eye, photophobia, and excessive lacrimation. Gross examination of the right eye with a penlight after the application of a topical anesthetic is insignificant. What is the best next step in the management of this patient?

1. ☐ Tonometry
2. ☒ Fluorescein examination 
3. ☐ Topical antibiotic
4. ☐ Ultrasonography
5. ☐ MRI of the orbits

**INCORRECT** 

**The correct answer is 2.**

This patient most probably sustained a high-velocity eye injury that is commonly associated with drilling, hammering, grinding, etc. In contrast to a low-velocity injury, a high-velocity injury has a greater probability of globe penetration and intraocular foreign body formation. The clinician should always be cognizant of such a possibility, even if initial presentation is subtle. Although not seen on gross examination, an abrasion or foreign body may be present. Fluorescein application following a Wood's lamp or, preferably, slit lamp examination is the most reasonable next step in this case.

**(Choice 4)** If a foreign body is not demonstrated and a strong suspicion remains, CT or ultrasonography can be considered. MRI is never performed for the diagnosis of a foreign body; in fact, it is contraindicated, since it can dislodge the foreign body because of the strong magnetic field.

**(Choice 3)** A topical antibiotic is applied after the foreign body has been removed.

**(Choice 1)** Tonometry is performed only if penetration of the globe is ruled out.

## 7. Question

1 points

A 35-year-old HIV-positive male is complaining of deterioration of his vision over the past week. He initially experienced eye pain and mild conjunctivitis, followed by rapid progressive visual loss. Examination of his eyes reveals marked keratitis. Funduscopy shows widespread, pale, peripheral retinal lesions and central necrosis of the retina. Which of the following is the most likely causative organism of this patient's condition?

1. ☐ Pseudomonas
2. ☐ Cytomegalovirus
3. ☒ Herpes simplex ✓
4. ☐ Candida albicans
5. ☐ Epstein Barr virus

**INCORRECT** ✖

**The correct answer is 3.**

Ophthalmologic problems occur in approximately half of patients with advanced HIV infection. Retinitis can occur as a complication of opportunistic infections in AIDS patients. Both varicella-zoster (VZV) and herpes simplex virus (HSV) can cause severe, devastating intraocular inflammation. Most cases of retinal disease are believed to be a reactivation of a previously acquired infection. In an immunocompromised individual, HSV retinitis may be characterized by rapidly progressing bilateral necrotizing retinitis (referred to as the "acute retinal necrosis syndrome"). This patient's clinical presentation is suggestive of acute retinal necrosis most likely due to HSV. The initial symptoms are keratitis and conjunctivitis with eye pain, followed by rapidly progressive visual loss. Funduscopy reveals widespread, pale, peripheral lesions and central necrosis of the retina.

**(Choice 2)** CMV retinitis is the most common serious ocular complication of HIV-positive patients; however, it is typically painless, and funduscopy shows fluffy or granular retinal lesions located near the retinal vessels and associated hemorrhages. It does not usually cause initial conjunctivitis or keratitis, as in this patient.

**(Choice 4)** Candida can cause endophthalmitis, especially with disseminated candidiasis infection. Patients with candida fungemia who appear sick should be evaluated by an ophthalmologist for possible endophthalmitis.

**(Choices 1 & 5)** Pseudomonas and Epstein-Barr virus are not common causes of retinitis in immunosuppressed patients.



A 38-year-old man with AIDS (Acquired Immune Deficiency Syndrome) is complaining of diminished vision in both eyes. His CD4 count last month was 50 cells/ul. He has been on highly active antiretroviral therapy for the past several months. He is afebrile, and his vital signs are stable. Ophthalmoscopic examination reveals yellow-white patches of retinal opacification and retinal hemorrhages. What is the most likely diagnosis?

1. ☐ Ocular toxoplasmosis.
2. ☐ Herpes simplex keratitis.
3. ☐ Herpes-zoster ophthalmicus.
4. ☒ CMV Retinitis. ✓
5. ☐ HIV retinopathy.

**INCORRECT** ✗

**The correct answer is 4.**

CMV retinitis occurs in AIDS patients with a CD4 count less than 50 cells/ul. It presents as yellowish-white patches of retinal opacification and retinal hemorrhages. In the initial stage, the eye is usually white and quiet. The treatment is ganciclovir or foscarnet.

**(Choice 1)** Ocular toxoplasmosis in the immunocompromised host is characterized by typical severe necrotizing retinochoroiditis. More than half of patients with ocular manifestations have encephalitis. The necrosis involves the inner layers of the retina, which appears as white, fluffy lesions surrounded by retinal edema and vitritis.

**(Choice 2)** Herpes simplex keratitis presents as pain, photophobia, and decreased vision. Dendritic ulcer is the most common presentation. There may also be minute clear vesicles in the corneal epithelium.

**(Choice 3)** Herpes zoster ophthalmicus is an infection caused by varicella-zoster virus. Most episodes occur in the elderly. It may be the presenting sign in patients with HIV and predict an increased risk of developing AIDS. It presents as fever, malaise, and a burning, itching sensation in the periorbital region. Examination reveals a vesicular rash in the distribution of the cutaneous branch of the first division of the trigeminal nerve. Conjunctivitis and dendritic corneal ulcers are the characteristic markers of eye involvement.

**(Choice 5)** HIV retinopathy in HIV-infected patients presents as benign, cotton wool spots in the retina which remit spontaneously.

## 9. Question

**1 points**

A 65-year-old man presents with complaints of decreased vision in both eyes. His visual impairment has been progressively worsening over the past five months. He was diagnosed with diabetes ten years ago. His current medications are metformin and glyburide. His blood pressure is

140/90 mm Hg, pulse is 82/min, respirations are 14/min, and temperature is 98.4 °F (36.88 °C). Examination shows decreased visual acuity in both eyes. Ophthalmoscopy reveals micro aneurysms, dot and blot hemorrhages, hard exudates, and macular edema. Which of the following is the most likely diagnosis?

1. ☐ Central retinal vein occlusion
2. ☒ Diabetic retinopathy ✓
3. ☐ Macular degeneration
4. ☐ Retinal detachment
5. ☐ Open angle glaucoma

**INCORRECT ✗**

**The correct answer is 2.**

Diabetic retinopathy is the leading cause of blindness. It occurs in both insulin dependent and non-insulin dependent diabetes mellitus. There are 3 main categories:

1. Background or simple retinopathy – consists of micro aneurysms, hemorrhages, exudates, and retinal edema, as in this patient.
2. Pre-proliferative retinopathy- with cotton wool spots.
3. Proliferative or malignant retinopathy – consists of newly formed vessels.

Patients are usually asymptomatic at first, despite early signs of retinopathy (e.g., micro aneurysms). Visual impairment occurs with the development of macular edema. Argon laser photocoagulation is the suggested treatment for the prevention of complications.

**(Choice 1)** Central retinal vein occlusion is characterized by sudden, unilateral visual impairment that is usually noted upon waking in the morning. Diabetics are at increased risk for retinal vein

occlusion. Ophthalmoscopy reveals disc swelling, venous dilation and tortuosity, retinal hemorrhages and cotton wool spots.

**(Choice 3)** Macular degeneration affects central vision. It is characterized by distorted vision and central scotoma. Cigarette smoking increases the risk of macular degeneration.

Ophthalmoscopy findings vary according to the type (i.e., atrophic vs. exudative). The atrophic form is characterized by multiple sores in the macular region, while the exudative form is characterized by new blood vessels that may leak, bleed, and scar the retina.

**(Choice 4)** Retinal detachment occurs unilaterally. It presents as blurred vision that progressively worsens. Ophthalmoscopy reveals the retina hanging in the vitreous.

**(Choice 5)** Open angle glaucoma is also seen in diabetics, but is characterized by gradual loss of peripheral vision, resulting in tunnel vision. Ophthalmoscopy shows pathologic cupping of the optic disc.

## 10. Question

1 points

A 69-year-old white male presents to your office complaining of progressive bilateral loss of vision over the past several months. He only has problems with his central vision. His peripheral field and navigational vision are not affected. He denies smoking and alcohol intake. He does not have any history of diabetes or hypertension. Two years ago, he had cataracts removed from both eyes. What is the most likely diagnosis?

1. ☐ Open angle glaucoma
2. ☒ Macular degeneration ✓
3. ☐ Recurrent cataracts
4. ☐ Central retinal artery occlusion
5. ☐ Retinal detachment

**INCORRECT** ✗

**The correct answer is 2.**

Age-related macular degeneration is usually seen in patients above 50 years of age. Patients present with progressive and bilateral loss of central vision. Peripheral fields and navigational vision are always maintained, but may become impaired by the development of cataracts. The condition results from degeneration and atrophy of the outer retina, retinal pigment epithelium, Bruch's membrane and choriocapillaris. Laser photocoagulation is the treatment of choice.

**(Choice 1)** Open angle glaucoma usually presents as a gradual loss of peripheral vision (over a period of years) and consequent tunnel vision. Central vision is spared.

**(Choice 3)** Cataracts, once removed, do not recur.

**(Choice 4)** Central retinal artery occlusion and retinal detachment are very acute conditions with complete vision loss.

## 11. Question

1 points

A 57-year-old female with a history of type 2 diabetes mellitus complains of fatigue, urinary frequency, increasingly blurred vision and worsening leg cramps over the past week. She reports that the symptoms all began following an upper respiratory infection 7 or 8 days ago. She does not take any medications, but adheres to a diet low in saturated fat and simple carbohydrates to manage her diabetes. On physical examination, her blood pressure is 160/90 mm Hg and her heart rate is 90/min. Her mucous membranes are dry. Her urine is positive for glucose but negative for ketones. Which of the following is the most likely cause of this patient's vision impairment?



1. ☐ Cataracts
2. ☐ Diabetic retinopathy
3. ☐ Arterial hypertension
4. ☒ Hyperosmolarity ✓
5. ☐ Eye infection

**INCORRECT ✗**

**The correct answer is 4.**

This is a diabetic patient who has developed non-ketotic hyperglycemia (evidenced by glucose present on urinalysis) following a recent upper respiratory infection. Type 2 diabetics are prone to develop nonketotic hyperosmolar syndrome (NKHS) in association with physiologic stressors like infection. Such stress causes elevations in the serum cortisol and catecholamine levels, substances that serve as insulin counterregulatory hormones. Severe hyperglycemia (serum glucose > 600 mg/dl) in the absence of significant ketosis can result. The resultant osmotic diuresis can cause dehydration and serum hyperosmolarity (often >320 mOsm/L).

Altered consciousness ranging from confusion to coma is the main symptom of the metabolic disturbances

in NKHS. Acute hyperglycemia can also cause blurred vision due to a myopic increase in lens thickness and intraocular hypotension secondary to hyperosmolarity.

**(Choice 1)** Cataracts can be a manifestation of chronic diabetes, especially in patients with suboptimal glycemic control. In these patients, cataracts are thought to result from the gradual accumulation of intralenticular sorbitol. This process would take longer than one week to develop.

**(Choice 2)** Diabetic retinopathy, particularly macular edema during the nonproliferative stage of retinal microangiopathy, can cause blurred vision. However, this would be expected to develop more chronically (usually in association with poor glycemic control over time) than the acute change in vision described above.

**(Choice 3)** This patient is hypertensive, but acute vision changes (secondary to retinal hemorrhages, exudates, and/or papilledema) require blood pressure elevations to malignant values (DBP > 120- 130).

**(Choice 5)** While acute infectious conjunctivitis, uveitis, and/or retinitis can potentially cause blurred vision, the process is usually monocular, and there are generally signs on physical examination.

An 80-year-old white male comes to the emergency department due to a sudden loss of vision in his left eye that occurred this morning upon waking up. He has had hypertension for the past several years. Current medications include ramipril and atenolol. His blood pressure is 140/90 mm Hg, pulse is 86/min, respirations are 14/min, and temperature is 36.8 °C (98.4 °F). Examination of the left eye reveals no abnormalities. Fundusoscopic examination shows swelling of the optic disk, retinal hemorrhages, dilated and tortuous veins, and cotton wool spots. Which of the following is the most likely diagnosis?

1. ☐ Acute angle-closure glaucoma
2. ☒ Central retinal vein occlusion ✓
3. ☐ Optic neuritis
4. ☐ Amaurosis fugax
5. ☐ Acute anterior uveitis

**INCORRECT** ✗

**The correct answer is 2.**

This patient's presentation is most consistent with central retinal vein occlusion (CRVO). CRVO should be considered in the differential diagnosis for acute or subacute monocular loss of vision, but it is typically not quite as acute as the vision loss seen in patients with central retinal artery occlusion. CRVO is associated with coagulopathy, hyperviscosity, chronic glaucoma, and atherosclerotic risk factors (including age, diabetes, and hypertension). The characteristic changes on fundusoscopic examination are sometimes referred to as the "blood and thunder" appearance, and include optic disk swelling, retinal hemorrhage, dilated veins, and cotton wool spots, all of which are seen in this patient. No treatment is particularly effective, but some patients may have partial recovery of vision within the first three months.

**(Choice 1)** The lack of eye pain, redness, or headache in this patient makes acute angle-closure glaucoma less likely. Patients with this condition may also report seeing halos around lights.

**(Choice 3)** Optic neuritis can also present with a fairly acute, unilateral loss of vision, but it is also associated with severe pain. Fundoscopy may reveal a swollen optic disk, and patients often have a visual field defect known as a central scotoma. Pupillary abnormalities are also commonly seen.

**(Choice 4)** Amaurosis fugax consists of temporary visual loss as opposed to the persistent visual loss seen in this patient. It is usually caused by atherosclerotic disease of the carotid arteries.

**(Choice 5)** Patients with anterior uveitis may have visual loss, but the affected eye is usually red and painful as well.

### 13. Question

1 points

A 32-year-old woman comes to the office distraught because "the colors look washed out!" She has had this vision impairment since yesterday. She also complains of pain on eye movements. Her vital signs are stable, and she is afebrile. Examination reveals decreased visual acuity, sluggish afferent pupillary response to light, and changes in color perception. Fundoscopy reveals a swollen disc. What is the most likely diagnosis?

1. ☐ Orbital cellulitis
2. ☒ Optic neuritis
3. ☐ Acute anterior uveitis
4. ☐ Open angle glaucoma
5. ☐ Episcleritis

**INCORRECT** ❌

**The correct answer is 2.**

Optic neuritis typically presents in people aged 20-45 years. Females are more commonly affected. Patients experience rapid impairment of vision in one eye (or rarely both) and pain on eye movement. There are marked changes in color perception. Afferent pupillary defect and field loss occur, usually with central scotoma. Optic neuritis is more common in patients with multiple sclerosis; such patients will usually give a history of similar occurrences in the past.

**(Choice 1)** Orbital cellulitis refers to infection posterior to the orbital septum. These infections are unilateral and more common in children. It presents as an abrupt onset of fever, proptosis, restriction of extraocular movements, and swollen, red eyelids.

**(Choice 3)** In anterior uveitis, the eye is usually painful and red, with blurring of vision. Typically, the eye has perilimbal injection. Examination reveals keratic precipitates. Corneal stromal edema may be present.

**(Choice 4)** Open angle glaucoma is characterized by gradual loss of peripheral vision resulting in tunnel vision. Ophthalmoscopy shows pathologic cupping of the optic disc.

**(Choice 5)** Episcleritis is an inflammation of the episcleral tissue between the conjunctiva and sclera. There is an acute onset of mild to moderate discomfort, photophobia, and watery discharge. Examination reveals diffuse or localized bulbar conjunctival injection, and episcleritis nodules may be present.

### 14. Question

1 points



A 34-year-old obese Caucasian female complains of periodic visual obscurations. She has episodes during which she “goes blind” for several seconds when standing up or stooping forward abruptly. She also describes frequent morning headaches over the last two months for which she has had to take ibuprofen or aspirin almost every morning. She takes no other medications. Past medical history is insignificant aside from one uncomplicated vaginal delivery. She denies use of alcohol, tobacco, or illicit drugs. She is afebrile with a blood pressure of 138/88 mm Hg and pulse of 93/min. Visual field testing shows enlarged blind spots. There are no other significant findings on neurologic examination. Which of the following is the most likely cause of this patient’s symptoms?

1. Optic neuritis
2. Glaucoma
3. Cataract
4. Papilledema ✓
5. Amaurosis fugax

**INCORRECT** ✗

**The correct answer is 4.**

This patient's presentation is concerning for increased intracranial pressure (ICP) resulting in papilledema. When intracranial pressure is increased, the pressure is transmitted to the optic nerve sheath resulting in swelling of the optic nerve head, which can be visualized as papilledema on ophthalmologic examination. Papilledema can cause visual symptoms such as momentary loss of vision that varies according to changes in head positioning. Normal individuals have a blind spot in their visual fields at the location of the optic nerve head, but this blind spot enlarges in patients with papilledema. Although headaches can be due to a variety of etiologies, those secondary to increased intracranial pressure are often worse in the morning, which is the case in this patient. There is no definite cause of this patient's elevated ICP based on the vignette, but given her fairly young age, obesity, and lack of additional comorbidities, one likely cause would be idiopathic intracranial hypertension (also known as pseudotumor cerebri). However, a CT or MRI of the brain would still be indicated to exclude an underlying mass lesion.

**(Choice 1)** Optic neuritis is commonly associated with multiple sclerosis, but can be seen with other disorders as well. It typically presents as unilateral eye pain and visual loss with an associated afferent pupillary defect.

**(Choice 2)** Glaucoma is caused by increased intraocular pressure. Patients may have peripheral visual field deficits, but they should not have intermittent loss of vision with changes in head position.

**(Choice 3)** Cataracts typically present with gradual loss of vision as opposed to the intermittent symptoms experienced by this patient.

**(Choice 5)** Amaurosis fugax is transient monocular blindness that lasts only a few minutes and is usually vascular in origin. It would be unlikely in this patient given her young age and low risk of atherosclerosis.

### 15. Question

1 points

A 33-year-old man presents with a 1-day history of localized, small swelling along the margin of the upper eyelid. He feels pain, which does not seem to come from the conjunctival surface. He has a 10-pack year smoking history. He occasionally drinks alcohol. He is sexually active, and does not use condoms regularly. He is worried about the swelling. What is the best next step in the management of this patient?

1. ☒ Use warm compresses ✓
2. ☐ Incision and drainage
3. ☐ Incision and curettage
4. ☐ Take biopsy of the lesion
5. ☐ Oral Penicillin

**INCORRECT** ✗

**The correct answer is 1.**

This patient has an external hordeolum or sty, which is a common staphylococcal abscess of the eyelid. It usually responds to the application of warm compresses.

**(Choice 2)** Incision and drainage is performed if resolution of the lesion does not begin in the next 48 hours.

**(Choice 3)** Incision and curettage is the treatment of choice for chalazion, which is a granulomatous inflammation of the meibomian gland.

**(Choice 4)** Performing a biopsy is incorrect since the lesion started acutely, and there is no reason to believe at this time that the lesion is cancerous.

**(Choice 5)** The patient may need antibiotic ointment such as bacitracin or erythromycin, but not oral penicillin.

### 16. Question

1 points

An 85-year-old man presents with a rash over his forehead, tip of nose and left eye. He also complains of pain and decreased vision. He has had fever, malaise, and a burning sensation around his left eye for the past 5 days. His blood pressure is 140/90 mm Hg, pulse is 92/min, respirations are 14/min, and temperature is 38.1 °C (101 °F). Physical examination reveals a vesicular rash on the periorbital region and lid margins. The left eye is red, with chemosis of the conjunctiva. Dendriiform ulcers are seen on the cornea. What is the most likely diagnosis?

1. ☐ Herpes simplex keratitis
2. ☐ Dacryocystitis
3. ☐ Bacterial keratitis
4. ☐ Trigeminal neuralgia
5. ☒ Herpes zoster ophthalmicus ✓

**INCORRECT** ✗

**The correct answer is 5.**

Herpes zoster ophthalmicus is an infection caused by varicella-zoster virus. Most episodes occur in the elderly or immunosuppressed. VZ virus remains latent in the trigeminal ganglion. During periods of immunosuppression, the virus travels via the ophthalmic branch to the forehead and the eye. Symptoms become manifest thereafter with fever, malaise and a burning, itching sensation in the periorbital region. Examination reveals a vesicular rash in the distribution of the cutaneous branch of the first division of the trigeminal nerve. Conjunctivitis and dendritic corneal ulcers characterize the eye involvement. Treatment started within 72 hrs after eruption with high dose acyclovir reduces the development of complications.

**(Choice 1)** Herpes simplex keratitis presents with pain, photophobia, and decreased vision. Dendritic ulcer is the most common presentation. There may also be minute clear vesicles in the corneal epithelium. The typical vesicular rash of herpes zoster and systemic symptoms are not seen.

**(Choice 2)** Dacryocystitis is an infection of the lacrimal sac due to obstruction of the nasolacrimal duct. It is characterized by pain, swelling, tenderness, and redness in the tear sac area. Mucous or pus can be expressed.

**(Choice 3)** Bacterial keratitis is usually seen in contact lens wearers, and following corneal trauma. The cornea appears hazy with a central ulcer and adjacent stromal abscess. Hypopyon may be present.

**(Choice 4)** The history is the only factor by which a diagnosis of trigeminal neuralgia is made clinically. It is characterized by a stabbing or shock-like pain over the distribution of the maxillary or mandibular division of the trigeminal nerve. The pain may be triggered by light touch or vibration. Rash is not seen.

## 17. Question

**1 points**

A 30-year-old man is concerned about "floating spots" and blurred vision in his right eye. He had a serious injury of his left eye several weeks ago, which eventually led to vision loss in that eye. Inspection reveals a moderate perilimbal flush. What is the most probable cause of this patient's



condition?

1. Reagin-mediated disease
2. Circulating immune complexes
3. Non-caseating granulomas
4. Uncovering of 'hidden' antigens ✓
5. Non-immune injury

**INCORRECT ✗**

**The correct answer is 4.**

Sympathetic ophthalmia is also known as "spared eye injury." It is characterized by an immune-mediated inflammation of one eye (the sympathetic eye) after a penetrating injury to the other eye. The typical manifestation is anterior uveitis, but panuveitis, papillary edema, and blindness may develop. The pathophysiological mechanism is believed to be the uncovering of 'hidden' antigens. Some antigens contained within the eye are protected from immunologic recognition by natural barriers. Breaking these barriers results in the uncovering of 'hidden' antigens. An immune response against these antigens can involve autoantibodies as well as a cell-mediated reaction.

**(Choice 1)** Reagin-mediated disease is seen in vernal conjunctivitis.

**(Choice 2)** Circulated immune complexes can affect the eye in systemic lupus erythematosus.

**(Choice 3)** Ocular injury by non-caseating granulomas is typical for sarcoidosis.

**(Choice 5)** Non-immunologic injury is less likely in this case.

## 18. Question

**1 points**

A 65-year-old female is complaining of seeing a sudden burst of flashing lights and blurred vision in her left eye. These symptoms started this morning. She now sees small spots in her field of vision. She felt "like a curtain came down" over her eye. She had a successful cataract extraction in her left eye 4 months ago. Her vital signs are stable. Examination shows a sluggish left pupil. Ophthalmoscopy reveals retinal tears and a grayish-appearing retina. What is the most probable diagnosis?

1. Choroidal rupture
2. Retinal detachment ✓
3. Central retinal artery occlusion

4. Proliferative diabetic retinopathy
5. Exudative macular degeneration

**INCORRECT** ❌

**The correct answer is 2.**

Retinal detachment refers to the separation of the layers of the retina. It usually occurs in people aged 40-70 years. Patients complain of photopsia (flashes of light) and floaters (spots in the visual field.). The most classic description is that of “a curtain coming down over my eyes.” Usually, the inciting event occurs months before retinal detachment. Myopia or trauma can cause retinal breaks, through which fluid seeps in and separates the retinal layers. In this patient, ocular trauma most likely occurred due to her cataract surgery.

Ophthalmoscopic examination reveals a grey, elevated retina. Laser therapy and cryotherapy are done to create permanent adhesions between the neurosensory retina, retinal pigment epithelium, and choroid.

**(Choice 1)** Choroidal rupture occurs due to blunt ocular trauma. Examination reveals central scotoma, retinal edema, hemorrhagic detachment of the macula, subretinal hemorrhage, and crescent-shaped streak concentric to the optic nerve. The usual complaint is blurred vision following blunt trauma.

**(Choice 3)** Central retinal artery occlusion (CRAO) is also characterized by a sudden painless loss of vision in one eye, but its funduscopy findings differ. Ophthalmoscopy of patients with CRAO reveals pallor of the optic disc, cherry red fovea, and boxcar segmentation of blood in the retinal veins.

**(Choice 4)** Proliferative diabetic retinopathy in the initial stage is asymptomatic. Patients may later complain of decreased visual acuity. Neovascularization is the hallmark of proliferative diabetic retinopathy. The other findings are vitreous hemorrhage and macular edema. These changes may lead to retinal detachment.

**(Choice 5)** Exudative macular degeneration typically presents as painless, progressive blurring of central vision, which can be acute or insidious. It occurs bilaterally. Testing reveals central scotoma. Ophthalmoscopy reveals growth of abnormal vessels in the retinal space. Sudden visual loss may occur if it is complicated by retinal detachment.

## 19. Question

**1 points**

A 67-year-old Caucasian male complains of progressive visual loss in his right eye over the past several months. He has a history of hypertension and type 2 diabetes mellitus. Current medications include a daily baby aspirin, hydrochlorothiazide, lisinopril, and metformin. There is no family history of visual problems. He has a 35 pack year smoking history and admits to occasional alcohol use. He is afebrile with a blood pressure of 137 /82 mm Hg and pulse of 73/min. Cardiac and pulmonary examinations are unremarkable. A neurologic examination demonstrates no focal motor or sensory

abnormalities. The patient is asked to cover his left eye and to look at a small spot on a grid made of parallel vertical and horizontal lines. He describes the vertical lines as being bent and wavy. Which of the following is the most likely cause of this patient's complaints?

1. ☐ Lens opacity
2. ☐ Enlarged blind spot
3. ☐ Increased intraocular pressure
4. ☒ Macular degeneration ✓
5. ☐ Peripheral retinal degeneration

**INCORRECT** ✗

**The correct answer is 4.**

The most likely diagnosis in this case is macular degeneration, which is the leading cause of blindness in industrialized countries. One of the earliest findings in macular degeneration is distortion of straight lines such that they appear wavy. The grid test described above is frequently used to screen for patients with macular degeneration. The primary risk factor for macular degeneration is increasing age, although smoking can increase the risk as well. Patients may be asymptomatic, but others complain of visual problems in either one or both eyes. Driving and reading are often some of the first activities that are affected since they require fine visual acuity, which is provided primarily by the macula. In addition to the grid test described above, ophthalmologic examination can identify drusen deposits in the macula, which are common lesions seen with this disorder.

**(Choice 1)** Lens opacification is the cause of visual loss from cataracts. Cataracts, however, should not cause straight lines to appear wavy.

**(Choice 2)** An enlarged blind spot may be seen with papilledema, but this patient has no evidence of increased intracranial pressure to result in papilledema.

**(Choice 3)** Increased intraocular pressure is the cause of glaucoma, which does not typically present with distortion of straight lines.

**(Choice 5)** Visualization of straight lines is a task that requires fine visual acuity, which is controlled primarily by the centrally-located macula as opposed to the more peripheral retina.

## 20. Question

**1 points**

A 35-year-old white female is complaining of blurry vision and pain with eye movements. She is on no medications and denies any trauma. Last year, she developed bladder incontinence and an episode of leg weakness, which both improved without therapy. Physical examination reveals reduced vision and swollen optic discs. The one diagnosis that may explain her symptoms is:



1. ☐ Parkinson disease
2. ☐ Myasthenia gravis
3. ☒ Multiple sclerosis ✓
4. ☐ Subdural hematoma
5. ☐ Transient ischemic attacks

**INCORRECT** ✖

**The correct answer is 3.**

Always suspect multiple sclerosis (MS) in a female with multiple neurologic presentations that are interspaced between time periods. The onset of MS is usually between the third and fourth decades, with recurrent attacks of focal neurologic dysfunction occurring at erratic and non-predictable intervals. Optic neuritis can result in blurring of vision, and is often associated with retrobulbar pain. Other findings may be sensory or motor dysfunction. Involvement of the brainstem may result in diplopia, nystagmus, vertigo, facial weakness or hemispasm.

**(Choice 1)** Parkinson's disease is usually seen between the fifth and seventh decades. It is characterized by tremor, bradykinesia and rigidity. Patients also have a fixed facial expression and problems with gait. Ocular pain, paralysis, alterations in reflexes and objective sensory findings are not seen in Parkinsonism.

**(Choice 2)** Myasthenia gravis is characterized by weakness in the proximal limb and torso muscles. The ocular muscles may or may not be involved. Patients present with diplopia, ptosis, facial weakness, and dysphagia. 10-15% of patients also have a thymoma. The ocular involvement is painless. The condition occurs because antibodies are formed against the neuromuscular junction.

**(Choice 4)** Subdural hematoma is usually seen in the elderly, especially after a fall. It can present with focal neurologic signs, but the symptoms are produced soon after the injury. When the eye is affected by cranial palsy, it is painless. The condition is easily diagnosed with a CT scan of the head.

**(Choice 5)** Transient ischemic attacks (TIAs) are usually due to emboli from carotid artery plaques. The emboli occlude the distal ophthalmic artery. TIAs may cause loss of vision in the eye, but the symptoms are painless, and eventually resolve (as implied by the name). Examination of the eye may reveal the presence of cholesterol particles (Hollenhorst bodies).

## 21. Question

**1 points**

A 65-year-old woman presents with complaints of pain and swelling over the inner aspect of her right eye for the past two days. Examination of the eye reveals tenderness, edema, and redness over the medial canthus. Slight pressure over the area causes expression of purulent material.

Visual acuity is normal. What is the most likely diagnosis?

1. Episcleritis
2. Dacryocystitis ✓
3. Dacryocystitis
4. Chalazion
5. Orbital cellulitis

**INCORRECT ✗**

**The correct answer is 2.**

Dacryocystitis is an infection of the lacrimal sac. It usually occurs in infants and adults over the age of 40. Acute dacryocystitis is characterized by the sudden onset of pain and redness in the medial canthal region. Sometimes, a purulent discharge is noted from the punctum. A few patients present with fever, prostration, and an elevated leukocyte count.

*Staphylococcus aureus* and  $\beta$ -hemolytic *Streptococcus* are the usual infecting organisms. It usually responds to systemic antibiotic therapy.

**(Choice 1)** Episcleritis is an infection of the episcleral tissue between the conjunctiva and sclera. Patients complain of an acute onset of mild to moderate discomfort, photophobia, and watery discharge. Examination reveals diffuse or localized bulbar conjunctival injection.

**(Choice 3)** Hordeolum refers to an abscess located over the upper or lower eyelid. It is usually caused by *Staphylococcus aureus*. It appears as a localized red, tender swelling over the eyelid.

**(Choice 4)** Chalazion presents as lid discomfort. It is a chronic, granulomatous inflammation of the meibomian gland. It appears as a hard, painless lid nodule.

**(Choice 5)** Orbital cellulitis refers to an infection posterior to the orbital septum. It is unilateral and more common in children. It is manifested by an abrupt onset of fever, proptosis, restriction of extraocular movements and swollen, red eyelids.

## 22. Question

**1 points**

A 65-year-old man complains of gradual onset blurred vision for the past two months. He also has difficulty driving at night and reading fine print. He has diabetes and hypertension. His medications include ramipril and metoprolol. His vital signs are stable. His best corrected vision is OD (right eye) 20/80, OS (left eye) 20/100, with full fields. Ophthalmoscopic examination with good pupillary dilatation reveals a loss of transparency of lens in both eyes. The red fundal reflex is normal, but retinal details are difficult to visualize. What is the most likely diagnosis?

1. ☐ Open angle glaucoma.
2. ☐ Retinal detachment.
3. ☐ Macular degeneration.
4. ☒ Cataract. ✓
5. ☐ Central retinal vein occlusion.

**INCORRECT** ✖

**The correct answer is 4.**

Cataract is a vision-impairing disease characterized by progressive thickening of the lens. Oxidative damage of the lens occurs with aging and leads to cataract formation. Patients usually complain of blurred vision and glare. Definitive treatment is lens extraction. The three commonly used procedures are phacoemulsification, extracapsular cataract extraction and intracapsular cataract extraction.

**(Choice 1)** Open angle glaucoma has an insidious onset, with gradual loss of peripheral vision and consequent tunnel vision. Intraocular pressures are high. Ophthalmoscopic examination reveals cupping of the optic disc.

**(Choice 2)** Retinal detachment usually occurs unilaterally and suddenly. Patients describe it as “a curtain falling in front of the eye” or obscuring a part of the visual field. Ophthalmoscopic examination reveals an elevated, detached retina.

**(Choice 3)** Macular degeneration affects central vision. The two forms are atrophic and exudative. The atrophic type is characterized by drusen and patchy depigmentation in the macular region. The exudative form is characterized by new blood vessels which can leak, bleed, and scar the retina. Dry type ARMD usually presents as a progressive, slow loss of vision in one or both eyes, while wet type ARMD presents as an acute distortion in vision, with wavy lines or loss of central vision, usually in one eye.

**(Choice 5)** Central retinal vein occlusion presents as a sudden loss of vision.

Ophthalmoscopy reveals a swollen disc, venous dilation, retinal hemorrhages, and cotton wool spots.

## 23. Question

**1 points**

A 28-year-old male presents to the emergency department complaining of neck pain for the past two days. He states that a chicken bone scratched the back of his throat a week ago. Two weeks ago, he was in Arizona visiting his friends. He is otherwise healthy and has never been hospitalized. His temperature is 39°C (102.2°F), blood pressure is 125/85 mmHg, and heart rate is 120/min. On examination, he refuses to fully open his mouth. Neck movements, especially neck extension, are restricted secondary to pain. Which of the following is the most likely diagnosis?



1. Meningitis
2. Herpangina
3. Epiglottitis
4. Diphtheria
5. Infectious mononucleosis
6. Retropharyngeal abscess ✓

**INCORRECT ✗**

**The correct answer is 6.**

This patient's presentation of neck pain, fever, and limited neck mobility secondary to pain should raise concern for a retropharyngeal abscess. Trismus (inability to open the mouth normally) and limited cervical extension are also very common in patients with a retropharyngeal abscess. The usual source of infection in the retropharyngeal space is from local penetrating trauma, which may occur after instrumentation or following an injury from a chicken bone, as is seen in this case. In order to fully evaluate the extent of the infection, a CT of the neck and/or lateral radiographs of the neck can be performed, which may demonstrate lordosis of the cervical spine with gas and swelling in the retropharyngeal space. Treatment consists of intravenous broad-spectrum antibiotics and urgent drainage of the abscess in order to avoid the dreaded complication of spread into the mediastinum.

**(Choice 1)** Although meningitis is often associated with fever and neck stiffness or pain, patients classically have increased pain with neck flexion as opposed to extension. In addition, this patient's complaints of trismus as well as his history of having a chicken bone scratch his throat are more consistent with a retropharyngeal abscess.

**(Choice 2)** Herpangina, which is caused by the Coxsackie A virus, results in the formation of vesicles on the tonsils and soft palate, and typically occurs in children. It usually causes a sore throat, fever, and pain with swallowing.

**(Choice 3)** Epiglottitis is a potentially lethal condition associated with a high-grade fever, severe sore throat, and pain with swallowing that can rapidly progress to cause airway obstruction. The symptoms of epiglottitis progress much more quickly than those seen in this patient.

**(Choice 4)** Diphtheria is an acute respiratory illness that typically causes a pseudomembranous pharyngitis. Clinical features include a low-grade fever, unilateral nasal discharge, pharyngitis, and cervical lymphadenopathy. Diphtheria would not, however, cause the neck pain seen in this patient.

**(Choice 5)** Infectious mononucleosis is characterized by the triad of fever, pharyngitis, and posterior cervical lymphadenopathy. Affected patients usually also complain of fatigue, and often have atypical lymphocytosis on peripheral blood smear.

## 24. Question

1 points

A 55-year-old female presents to the office with a one-week history of left-sided ear pain and itchiness. The pain is especially bothersome at night, and is exacerbated by chewing. She denies any hearing loss. Her past medical history is significant for hypertension, type 2 diabetes mellitus, hyperlipidemia, and gout. Current medications include lisinopril, allopurinol, and metformin. She has missed her last two appointments with her primary care physician. Her temperature is 38.3°C (101.0°F), blood pressure is 140/90 mmHg, and pulse is 98/min. On examination, there is granulation tissue in the left ear canal with a scant amount of discharge. Which of the following is the best initial treatment for this patient?

1. ☐ Topical neomycin
2. ☐ Topical low-strength corticosteroids
3. ☒ Ciprofloxacin ✓
4. ☐ Ampicillin/sulbactam
5. ☐ Surgical debridement

**INCORRECT** ✗

**The correct answer is 3.**

This patient's presentation is concerning for malignant otitis externa (MOE), which is a severe pseudomonal infection of the external auditory canal. Most patients with MOE are elderly, and often have poorly controlled diabetes. The primary symptoms are severe ear pain and drainage, and patients usually have a fever. The otoscopic finding of granulation tissue in the external auditory canal is consistent with MOE. Osteomyelitis of the skull base or temporomandibular joint can develop as the infection progresses, and may be in its early stages in this patient given her history of pain that is exacerbated with chewing. Involvement of the cranial nerves is sometimes seen as well. Given the severity of MOE, systemic therapy with an anti-pseudomonal antibiotic is recommended, with ciprofloxacin being the drug of choice.

**(Choice 1)** Topical antibiotics are not recommended in the treatment of MOE, and may lead to difficulty culturing the organism if they are applied.

**(Choice 2)** Topical corticosteroids may be used in some patients with external otitis, but they would likely lead to severe worsening of the infection in a patient with MOE.

**(Choice 4)** Ampicillin/sulbactam is not effective in the treatment of *Pseudomonas aeruginosa*, which is the most common bacteriologic cause of MOE.

**(Choice 5)** Surgery is not generally used in the treatment of MOE unless there is concern that the patient's symptoms may be secondary to neoplasm.

## 25. Question

1 points

A 7-year-old boy with a 6-day history of nasal discharge presents with a swollen and painful left eye. His blood pressure is 100/70 mm Hg, pulse is 92/min, respirations are 18/min, and temperature is 39.4°C (103°F). Examination of the left eye reveals swollen and erythematous eyelids, mild protrusion of the eyeball, and pain with eye movements. The affected eye is tender and his visual acuity is decreased. Funduscopy examination is normal. Which of the following is the most likely diagnosis?

1. Anterior uveitis
2. Cavernous sinus thrombosis
3. Conjunctivitis
4. Optic neuritis
5. Orbital cellulitis ✓

**INCORRECT** ✗

**The correct answer is 5.**

In any patient who presents with a swollen and painful eye accompanied by fever, it is important to differentiate orbital cellulitis (infection involving the fat and muscles within the orbit) from preseptal cellulitis (infection that involves only the superficial tissues). Both conditions are more common in children. This patient's history of nasal discharge may be compatible with sinusitis, which is a predisposing factor in the development of orbital cellulitis, but not preseptal cellulitis. Although pain with eye movement is more common in patients with orbital cellulitis, it can occur in preseptal cellulitis as well. Both protrusion of the eyeball (proptosis) and decreased visual acuity, however, are usually only seen with orbital cellulitis. CT can be helpful if the clinical presentation is indeterminate or if there is concern for abscess formation. Treatment requires intravenous broad-spectrum antibiotics.

**(Choice 1)** Patients with anterior uveitis commonly present with a red and painful eye, but the eyelids should not be involved. Anterior uveitis may occur secondary to infection or systemic inflammatory disease.

**(Choice 2)** Cavernous sinus thrombosis (CST) is also characterized by periorbital edema, exophthalmos, and chemosis, but fundoscopy typically reveals papilledema and dilated tortuous retinal veins. Although it is often difficult to differentiate CST from orbital cellulitis, the symptoms of CST are often bilateral, and there is often involvement of cranial nerves III (resulting in ptosis) and V as well as early visual loss.

**(Choice 3)** Conjunctivitis presents with isolated erythema of the conjunctiva, and would not cause the proptosis and pain with eye movements that are seen in this patient.

**(Choice 4)** Optic neuritis can cause pain with eye movements, but it will not cause protrusion of the eyeball, edema of the eyelids, or a high-grade fever. In addition, pupillary changes are usually seen in optic neuritis.



## 26. Question

1 points

A 45-year-old Asian male complains of a progressively worsening sore throat and difficulty swallowing for the past 24 hours. You notice that his voice is muffled and he is drooling. He also has a harsh shrill associated with respiration. His temperature is 39.3°C (103°F), blood pressure is 120/80 mmHg, pulse is 106/min, and respiratory rate is 22/min. On examination, a few cervical lymph nodes are palpable and there is tenderness to palpation over his larynx. Which of the following are the two most common organisms that cause this condition?

1. ☒ Haemophilus influenzae and Streptococcus pyogenes ✓
2. ☐ Mycobacterium tuberculosis and herpes simplex virus
3. ☐ Haemophilus influenzae and Candida species
4. ☐ Streptococcus pyogenes and Klebsiella pneumoniae
5. ☐ Staphylococcus aureus and Pseudomonas aeruginosa

**INCORRECT** ✗

**The correct answer is 1.**

The abrupt onset and rapid progression of this patient's symptoms should immediately raise concern for epiglottitis, which is a potentially life-threatening infection that is characteristically associated with a high grade fever, a severe sore throat with odynophagia (pain on swallowing) and drooling, and progressive airway obstruction. The harsh shrill that this patient has most likely represents stridor, which can occur in some patients with epiglottitis. Prior to the widespread use of the Haemophilus influenzae type B (Hib) vaccine in children, Hib caused the vast majority of cases of epiglottitis, followed by Streptococcus pyogenes. In adults, particularly those from other countries as seen in this case, epiglottitis caused by Hib can still occur because many of these individuals have not been properly vaccinated. As a result, clinicians should have a high index of suspicion of epiglottitis when patients present acutely similar to the patient in this vignette.

**(Choice 2)** Herpes simplex virus type 1 has rarely been associated with epiglottitis, but Mycobacterium tuberculosis has not.

**(Choice 3)** Certain Candida species may cause epiglottitis in immunocompromised patients. This patient, however, has no history of being immunocompromised.


**(Choice 4)** Streptococcus pyogenes, as mentioned above, can cause epiglottitis, especially as a complication of varicella infection. Klebsiella pneumoniae, however, does not cause epiglottitis.

**(Choice 5)** Although Staphylococcus aureus can be the cause of epiglottitis in some individuals, Pseudomonas aeruginosa typically only causes epiglottitis in immunocompromised hosts.

## 27. Question

1 points

A 60-year-old man comes to your office complaining of difficulty hearing for the past few weeks. He has type 2 diabetes mellitus, which is well-controlled by diet alone. His past medical history is also significant for essential hypertension, congestive heart failure secondary to diastolic dysfunction, and chronic renal failure. Medications include aspirin, diuretics, an ACE inhibitor, and a  $\beta$ -blocker. His pulse is 82/min, blood pressure is 140/90 mm Hg, and respirations are 14/min. Examination reveals hearing loss in both ears. Which of the following medication is a potential cause of this patient's hearing problems?

1. ☐ Lisinopril
2. ☐ Aspirin
3. ☐ Metoprolol
4. ☒ Furosemide 
5. ☐ Hydrochlorothiazide

**INCORRECT** 

**The correct answer is 4.**

This patient's complaints of new-onset, bilateral hearing loss raises concern for medication-induced ototoxicity. There are a large number of ototoxic medications that can cause sensorineural hearing loss, including aminoglycoside antibiotics, chemotherapeutic agents, aspirin, and loop diuretics. With this patient's history of congestive heart failure, one of the diuretics he may be taking is the loop diuretic furosemide, which is well-known to potentially cause ototoxicity. Loop diuretics are associated with reversible or permanent hearing impairment, reversible deafness, and/or tinnitus. The risk of ototoxicity is greater in patients taking high doses of furosemide, but patients who have coexistent renal failure, as is the case in this vignette, may experience hearing loss or deafness at lower doses.

**(Choice 1)** Lisinopril is an ACE inhibitor that is classically associated with the side effects of cough, hyperkalemia, and angioedema. It does not cause ototoxicity.

**(Choice 2)** Aspirin usually causes tinnitus; but in very higher doses it can cause (6 to 8 grams/day) hearing loss. This patient's hearing loss is more likely to be associated with loop diuretics.

**(Choice 3)**  $\beta$ -blockers, such as metoprolol, are associated with many significant side effects, including increased airway resistance, bradycardia, fatigue, and depression among many others. Hearing loss, however, is not a common side effect of  $\beta$ -blockers.

**(Choice 5)** Hydrochlorothiazide is a thiazide diuretic that can cause orthostatic hypotension, photosensitivity, hypercalcemia, or other potential side effects. Hearing loss, however, is not associated with hydrochlorothiazide.

## 28. Question

1 points

A 32-year-old male complains of difficulty hearing in his left ear for the past month. He denies any headaches, fever, chills, weight loss, or ear discharge. He is HIV positive, and is currently being treated with highly active antiretroviral therapy (HAART). He also takes trimethoprim/sulfamethoxazole daily. His most recent CD4 count was  $425/\text{mm}^3$ . Examination of the affected ear shows a dull, hypomobile tympanic membrane. What is the most likely cause of hearing loss in this patient?

1. ☐ Neoplasia
2. ☒ Non-infectious effusion
3. ☐ Otosclerosis
4. ☐ Opportunistic infection
5. ☐ Demyelination

**INCORRECT** ❌

**The correct answer is 2.**

Serous otitis media is the most common middle ear pathology in patients with acquired immunodeficiency syndrome. It is due to the auditory tube dysfunction arising from HIV lymphadenopathy or obstructing lymphomas. Serous otitis media is characterized by the presence of a middle ear effusion without evidence of an acute infection. Conductive hearing loss is the most common symptom experienced by patients with serous otitis media, and examination typically reveals a dull tympanic membrane that is hypomobile on pneumatic otoscopy.

**(Choice 1)** HIV-infected individuals are at risk of developing one of many different malignancies. This patient, however, appears to be fairly well-controlled on his HAART therapy. In addition, unilateral hearing loss would be an unusual presentation of an HIV-associated malignancy.

**(Choice 3)** Otosclerosis is a form of conductive hearing loss that results from bony overgrowth of the stapes. It does occur in middle-aged individuals, but would not be associated with the examination findings seen in this patient.

**(Choice 4)** As mentioned above, patients with HIV are at risk of developing one of several opportunistic infections. This patient, however, is well-controlled on the current regimen of HAART and trimethoprim/sulfamethoxazole, and therefore an opportunistic infection is unlikely to be the cause of his hearing loss.

**(Choice 5)** Progressive multifocal leukoencephalopathy (PML) is a demyelinating disease that can occur in patients with HIV/AIDS, but is less likely in patients on HAART and usually only occurs in patients with CD4 counts  $< 200/\text{mm}^3$ . In addition, hearing loss would be an



atypical presenting symptom in patients with PML.

## 29. Question

1 points

A 65-year-old female complains of difficulty eating over the last two days. She states that food drops out of her mouth. She has also been having some discharge in her left ear recently. She denies any sore throat, nasal discharge, chest pain, cough, or difficulty breathing. Her past medical history is significant for type 2 diabetes mellitus, hypertension, and hyperlipidemia. She has been poorly compliant with follow-up appointments. Her temperature is 38.8°C (101.7°F), pulse is 96/min, blood pressure is 140/90 mm Hg, and respirations are 18/min. Examination of the left ear canal shows granulations. There is facial asymmetry, and the angle of the mouth on the left is deviated downward. Which of the following is the most likely causative organism for this patient's condition?

1. ☐ Rhizopus species
2. ☒ Pseudomonas aeruginosa ✓
3. ☐ Staphylococcus aureus
4. ☐ Aspergillus niger
5. ☐ Herpes zoster

**INCORRECT** ✗

**The correct answer is 2.**

This patient's presentation is most consistent with malignant otitis externa (MOE), which is a severe infection typically seen in elderly diabetic patients that is most commonly caused by *Pseudomonas aeruginosa*. Patients typically present with ear pain and ear drainage that is not responsive to topical medications. The granulation tissue seen within the ear canal in this patient is a characteristic manifestation of MOE, and her history of poorly controlled diabetes is also a diagnostic clue. Progression of the infection can lead to osteomyelitis of the skull base and cranial nerve damage. This patient's facial drooping, which is likely causing food to drop out of her mouth, is a result of damage to the left facial nerve. CT or MRI can be used to confirm the diagnosis. Treatment consists of systemic antibiotics that are effective against *Pseudomonas aeruginosa*, such as ciprofloxacin. Topical antibiotics are ineffective.

**(Choice 1)** Patients with poorly controlled diabetes are susceptible to *Rhizopus* infections, but these infections typically begin in the paranasal sinuses and extend into the orbit and brain.

**(Choice 3)** *Staphylococcus aureus* is a rare cause of malignant otitis externa.


**(Choice 4)** Overall, *Aspergillus* species rarely cause malignant otitis externa. They are, however, the most common fungal cause.

**(Choice 5)** The most typical manifestation of herpes zoster infection in the ear is Ramsay Hunt syndrome, which presents with facial nerve palsy and vesicles in the auditory canal and auricle.

### 30. Question

1 points

A 7-year-old boy is brought to your office with a sore throat, decreased appetite, and nausea. His past medical history is insignificant. All of his vaccinations are up-to-date. He has no known allergies. His temperature is 39.0 °C (102.5 °F), blood pressure is 110/70 mm Hg, pulse is 104/min, and respirations are 16/min. On examination, the pharynx and tonsils are red, swollen, and have white exudates on their surface. There is also bilateral tender cervical lymphadenopathy. The rapid diagnostic test for streptococcal antigen is positive. What is the most appropriate next step in management?

1. Throat culture
2. Monospot test
3. Antistreptolysin O antibodies
4. Oral penicillin V 
5. Oral azithromycin

**INCORRECT** 

**The correct answer is 4.**

This patient's clinical presentation, even without the positive streptococcal antigen test, is suggestive of streptococcal pharyngitis. Group A streptococcus is the most common cause of bacterial pharyngitis. His fever, painful cervical lymphadenopathy, and exudative pharyngitis are all compatible with streptococcal pharyngitis. Patients with viral pharyngitis typically have symptoms of conjunctivitis, rhinorrhea, or a viral exanthem, all of which are absent in this patient. Since there can be overlap in the presentations of streptococcal and viral pharyngitis, confirmation with a rapid streptococcal antigen test is recommended. Antimicrobial therapy is warranted in all patients with streptococcal pharyngitis in order to hasten recovery, prevent transmission, and reduce the incidence of complications, such as rheumatic fever. Since group A streptococcus remains sensitive to penicillin, this is the recommended antibiotic treatment.

**(Choice 1)** The rapid test for the streptococcal antigen has a high specificity but a limited sensitivity. Therefore, a positive result does not need confirmation with a throat culture, but a culture should be performed if the rapid test is negative.

**(Choice 2)** Mononucleosis tends to occur more frequently in adolescent patients. In addition, since this patient's rapid streptococcal antigen test has already come back positive, further diagnostic evaluation with a Monospot test is unnecessary.


**(Choice 3)** Antistreptolysin O antibodies can be helpful in patients with glomerulonephritis to determine if there has been a recent streptococcal infection, but they are not necessary in this case because it is already known that this patient currently has a streptococcal infection.

**(Choice 5)** Macrolide antibiotics such as azithromycin can be used to treat streptococcal pharyngitis in patients who are allergic to penicillin.

### 31. Question

1 points

A 37-year-old woman presents to your office with severe vertigo, postural instability, and vomiting. She also complains of "a buzzing sound" in her right ear. She has had two similar episodes over the previous year that lasted several hours and resolved spontaneously. She has no other medical problems. Her mother died of breast cancer at 55 years of age and her father is currently suffering from colon cancer. Her heart rate is 90/min and blood pressure is 130/80 mmHg. Her BMI is 25.3 kg/m<sup>2</sup>. Examination reveals horizontal nystagmus. Which of the following could have prevented this patient's symptoms?

1. Caloric restriction
2. Low salt diet 
3. Gluten-free diet
4. High complex carbohydrate diet
5. Calcium supplementation

**INCORRECT** 

**The correct answer is 2.**

This patient has Meniere's disease, which is a disorder resulting from distention of the endolymphatic compartment of the inner ear. The classic presentation consists of episodes of vertigo that last 20 minutes to 24 hours in addition to low-frequency, sensorineural hearing loss and tinnitus. Vertigo can be accompanied by vomiting and postural instability.

Symptoms typically wax and wane, but the course of the disease varies between individuals. Nystagmus may be seen during an acute attack, which is what this patient is currently experiencing. Triggers that increase endolymphatic retention should be avoided, including alcohol, caffeine, nicotine, and foods high in salt. A strict, salt-restricted diet of two to three grams of sodium per day is recommended as initial therapy, but the evidence supporting its



effects on controlling the symptoms of Meniere's disease is not available. Medical therapy with diuretics, antihistamines, or anticholinergics is usually considered if lifestyle modifications are unsuccessful.

**(Choice 1)** This patient's BMI of  $25.3 \text{ kg/m}^2$  means that her weight is within an acceptable range. In addition, caloric restriction has no role in the management of Meniere's disease.

**(Choice 3)** A gluten-free diet is recommended for patients with celiac disease, not Meniere's disease.


**(Choice 4)** A high complex carbohydrate diet has not been shown to improve the symptoms of Meniere's disease.

**(Choice 5)** Calcium supplementation has not been shown to be helpful in the treatment of Meniere's disease.

### 32. Question

1 points

A 36-year-old woman presents to your office with complaints of worsening throat pain for the past six days. She also has pain in her ears and neck as well as difficulty swallowing. On examination, she has excessive salivation and difficulty opening her mouth. Her temperature is  $39^\circ\text{C}$  ( $102.2^\circ\text{F}$ ), blood pressure is 130/80 mm Hg, pulse is 100/min, and respiratory rate is 18/min. Which of the following neck space infections carries the highest risk of mediastinal involvement?

1. ☐ Submandibular space
2. ☐ Sublingual space
3. ☐ Parapharyngeal space
4. ☒ Retropharyngeal space 

**INCORRECT** 

**The correct answer is 4.**

Although deep neck space infections have become less common since the advent of widespread antibiotic use, these infections have a very rapid onset and carry potentially fatal complications, requiring the clinician to be aware of and properly identify such infections. Of all of the locations listed above, infection in the retropharyngeal space carries the highest risk of spread to the mediastinum, particularly the anterior and posterior portions of the superior mediastinum as well as to the entire length of the posterior mediastinum. In patients with an infection in the retropharyngeal space, an abscess can form in the "danger space", which lies between the alar and prevertebral fasciae, and drain by gravity into the posterior mediastinum, resulting in acute necrotizing mediastinitis. Early diagnosis and debridement of the mediastinum is essential in the treatment of this severe complication.

**(Choice 1)** An infection in the submandibular space, also known as Ludwig's angina, typically begins in the floor of the mouth and extends through the submandibular and sublingual space into the tissues surrounding the airway. It does not commonly extend into the mediastinum.

**(Choice 2)** The sublingual space is a division of the submandibular space. As a result, an infection in the sublingual space is classified as a submandibular infection as well, which typically involves the tongue, palate, pharynx, epiglottis, and tissues surrounding the upper airway.

**(Choice 3)** The major complication of an infection in the parapharyngeal space is involvement of the carotid sheath, which may lead to erosion of the carotid artery and jugular thrombophlebitis.

### 33. Question

1 points

A 23-year-old male comes to your office with a 10-day history of severe headaches. He states that they are sharp in character and are mostly right-sided involving the frontal area. The headaches interfere with his sleep, and he also complains of double vision, nausea, and malaise. His blood pressure is 120/80 mm Hg, pulse is 103/min, respirations are 14/min, and temperature is 38.0 °C (100.5 °F). Examination reveals bilateral periorbital edema. There is subtle right-sided lateral gaze palsy. Which of the following is the most likely diagnosis?

1. Orbital cellulitis
2. Acute angle-closure glaucoma ✓
3. Acute angle-closure glaucoma
4. Cavernous sinus thrombosis
5. Cluster headaches

**INCORRECT** ✗

**The correct answer is 2.**

The most likely diagnosis in this patient is cavernous sinus thrombosis (CST). Most cases of CST are secondary to an infection located in the medial aspect of the face around the eyes and nose, but ethmoid or sphenoid sinus infections can be the culprit as well. Headache is the most common early symptom seen in patients with CST. A low-grade fever and periorbital edema usually occur several days later secondary to impaired venous flow in the orbital veins. This patient's lateral gaze palsy on the right is most likely secondary to an abducens nerve palsy (CN VI), and is probably the cause of his double vision. Cranial nerves III, IV, V1, V2, and VI all pass through the cavernous sinus and can be affected in patients with CST. The headache that occurs in these patients is partly due to neuropathic

pain as a result of irritation of the V1 and V2 branches of the trigeminal nerve, which explains why the pain is usually sharp and located in the upper face. Diagnosis can be confirmed with either MRI or CT scan of the orbits with contrast. Intravenous broad-spectrum antibiotic treatment is required, but anticoagulation, glucocorticoid therapy, or surgery may be used in some cases.

**(Choice 1)** Orbital cellulitis is often difficult to distinguish from cavernous sinus thrombosis, but the presence of cranial nerve abnormalities and bilateral periorbital edema tend to favor the diagnosis of cavernous sinus thrombosis.

**(Choice 2)** Acute angle-closure glaucoma is typically seen in elderly patients, and presents with eye pain, visual loss, and headache. Patients often report seeing halos around lights, and on examination, the eye is typically red with a hazy cornea.

**(Choice 3)** Periorbital edema and cranial nerve palsies are atypical for migraines.

**(Choice 5)** Cluster headaches are repetitive headaches that are severe, unilateral, and usually occur around the eye. Periorbital edema and abducens nerve palsy would not be seen.

#### 34. Question

1 points

A 24-year-old female complains of recurrent painful ulcers in her mouth and occasional abdominal pain. She has also unintentionally lost 5 pounds over the last six months. She is not sexually active, and denies use of tobacco, alcohol, or drugs. Past medical history is noncontributory and she takes no regular medications. Her mother suffers from asthma and her father has prostate cancer. She is afebrile with a blood pressure of 118/69 mm Hg and pulse of 71/min. Physical examination reveals mild abdominal tenderness primarily in the lower abdomen without guarding or rebound. Several shallow ulcers are seen on the buccal mucosa. A biopsy of one of the ulcers demonstrates granulomatous inflammation. Her hematocrit is 42%. Which of the following is the most likely cause of this patient's complaints?

1. Celiac disease
2. Folic acid deficiency
3. Crohn's disease ✓
4. Oral candidiasis
5. Squamous cell carcinoma

**INCORRECT** ✗

**The correct answer is 3.**

The most likely diagnosis in this patient is Crohn's disease. Crohn's disease can involve any component of the gastrointestinal tract from the mouth to the anus, and characteristically has



skip areas of involvement. Aphthous ulcers, such as those seen in this patient's mouth, are an occasional component of the disease, but are fairly nonspecific by themselves. This patient's abdominal pain is likely caused by Crohn's disease, and could be confirmed either with an abdominal CT, a small bowel fluoroscopic study, or endoscopy. Granulomas can be seen pathologically in up to 30% of patients with Crohn's disease, and can confirm the diagnosis in the absence of granulomatous infections. Since patients with this condition often have a nonspecific presentation with weight loss and vague abdominal pain, correlating the patient's symptoms with any extra-intestinal findings associated with Crohn's disease can help to suggest the diagnosis.

**(Choice 1)** Celiac disease may result in weight loss, abdominal pain, and oral ulcers, but would not produce granulomatous inflammation.

**(Choice 2)** Folic acid deficiency can cause oral ulcers, but would not cause abdominal pain.

**(Choice 4)** Oral candidiasis usually presents with white plaques of thrush as opposed to oral ulcers.

**(Choice 5)** Granulomas would not be expected on pathologic specimens of squamous cell carcinoma (SCC). In addition, SCC would be unlikely in this patient given her young age and lack of tobacco or alcohol use.

### 35. Question

1 points

A 70-year-old man comes to your office with complaints of difficulty hearing. His wife says that he has been raising the television volume much louder recently. The patient claims that he can hear well when he talks to his family members at home, but he has significant difficulty hearing in restaurants or during other family gatherings, which is why he prefers to stay at home most of the time. He worked in a shipbuilding yard for 30 years, and retired five years ago. He has no history of significant noise exposure. What is the most likely diagnosis?

1. ☐ Otosclerosis
2. ☒ Presbycusis ✓
3. ☐ Middle ear effusion
4. ☐ Meniere's disease
5. ☐ Acoustic neuroma

**INCORRECT** ✗

**The correct answer is 2.**

This patient's hearing difficulties are most likely caused by presbycusis, defined as sensorineural hearing loss that occurs with aging. The hearing loss associated with presbycusis is typically first noticed in the sixth decade of life, and characteristically begins

with symmetrical, high-frequency hearing impairment. Patients often complain of difficulty hearing in crowded or noisy environments, similar to what this patient describes. In addition, affected patients usually have trouble hearing high-pitched noises or voices. Although presbycusis is a disease of aging, multiple factors have been shown to influence the rate of hearing loss, including medications, genetics, a history of infection, and exposure to loud noise.

**(Choice 1)** Otosclerosis is a type of chronic conductive hearing loss associated with bony overgrowth of the stapes. It typically begins with low-frequency hearing loss and is often found in middle-aged individuals.

**(Choice 3)** A middle ear effusion, as is seen in patients with serous otitis media, often produces tinnitus and a sensation of pressure in addition to conductive hearing loss.

**(Choice 4)** Patients with Meniere's disease present with episodes of tinnitus, vertigo, and sensorineural hearing loss. This patient does not complain of vertigo or tinnitus.

**(Choice 5)** The most common tumor that causes sensorineural hearing loss is an acoustic neuroma. It is associated with unilateral hearing loss as opposed to the bilateral hearing loss of presbycusis.

### 36. Question

1 points

A 12-year-old girl comes to the office complaining of a small amount of left-sided ear discharge that has persisted for the last three weeks. She has completed two courses of antibiotics that were prescribed during her previous visits. She also complains of hearing loss on the left side. On examination, she is afebrile. Otoscopy reveals an intact left tympanic membrane with peripheral granulation and some skin debris. The patient should be evaluated for which of the following?

1. Meniere's disease
2. Craniopharyngioma
3. Otosclerosis
4. Cholesteatoma ✓
5. Middle ear osteoma

**INCORRECT** ✗

**The correct answer is 4.**

This patient should undergo further evaluation for a possible cholesteatoma. Cholesteatomas in children can either be congenital or acquired, with congenital lesions typically found in younger patients around the age of five. Acquired cholesteatomas usually occur secondary to chronic middle ear disease. The diagnosis should be suspected in any patient with continued ear drainage for several weeks despite appropriate antibiotic therapy. Chronic

middle ear disease leads to the formation of a retraction pocket in the tympanic membrane, which can fill with granulation tissue and skin debris, as seen in this patient. Complications of cholesteatomas include hearing loss (which this patient appears to already be experiencing), cranial nerve palsies, vertigo, and potentially life-threatening infections such as brain abscesses or meningitis. This patient should be referred to an otolaryngologist for a dedicated otologic exam, possibly accompanied by a CT and/or surgical visualization to confirm the diagnosis.

**(Choice 1)** Meniere's disease is a condition associated with an accumulation of fluid in the inner ear that leads to hearing loss, vertigo, and tinnitus. The presence of ear drainage and the lack of vertigo make Meniere's disease unlikely in this case.

**(Choice 2)** Craniopharyngioma is a tumor that can occur in children. However, it is derived from Rathke's pouch, which is located in the suprasellar space.

**(Choice 3)** Otosclerosis is a condition in which there is bony overgrowth of the stapes footplate that results in conductive hearing loss. Ear drainage would not be present.

**(Choice 5)** An osteoma is a benign, solitary area of bony overgrowth that can form in the outer ear and lead to hearing loss. However, the findings present on this patient's tympanic membrane are more typical for cholesteatoma.

### 37. Question

1 points

A 33-year-old female has suffered from recurrent episodes of dizziness over the last six months. She describes the episodes as a sensation of severe spinning that last one to two hours and are accompanied by intense nausea. She also feels unsteady during the episode, and has to lie down with her eyes closed for relief. There is no particular factor that precipitates the episodes. She denies any headaches, but complains of fullness in her right ear. She has no ear pain or ear discharge. She has used some over-the-counter ear drops with minimal relief of the fullness sensation. She prefers holding her cell phone on the left side. Which of the following is the most likely cause of this patient's condition?

1. ☐ Middle ear disease
2. ☒ Inner ear disease ✓
3. ☐ Cranial nerve VIII lesion
4. ☐ Cerebellar disease
5. ☐ Lesion in the medulla

INCORRECT ✗



**The correct answer is 2.**

The first step in the evaluation of a patient with dizziness is to classify the symptoms as vertigo, presyncope, or disequilibrium. This patient's history of a severe spinning sensation accompanied by nausea is most characteristic of vertigo. The next step is to classify her vertigo as either central or peripheral. Although peripheral vertigo tends to last for shorter intervals than central vertigo, this patient's history of dizziness that lasts for one to two hours is indeterminate. However, her symptoms of ear fullness and her preference for using her cell phone on the left suggest a peripheral cause. Ear fullness in particular is suggestive of Meniere's disease, which results from an abnormal accumulation of endolymph within the inner ear. The underlying etiology of Meniere's disease is not completely understood.

Patients with Meniere's disease will often complain of hearing loss and tinnitus as well, which may be the reason this patient prefers to use her cell phone with her left ear.

**(Choice 1)** Disorders of the middle ear are associated with many causes of hearing loss, but middle ear disease does not typically lead to vertigo.

**(Choice 3)** A lesion of the eighth cranial nerve can lead to central vertigo, but this patient's symptom of ear fullness makes Meniere's disease more likely.

**(Choice 4)** Patients with cerebellar lesions may have vertigo, but it is usually accompanied by other signs of cerebellar dysfunction, such as incoordination or imbalance.

**(Choice 5)** Lateral medullary infarction, also known as Wallenberg syndrome, can present with intense vertigo. However, other neurologic problems such as gaze abnormalities, limb ataxia, sensory loss, and Homer's syndrome are often present as well.

**38. Question**

**1 points**

A 62-year-old male comes to your office for a routine follow-up appointment. He has smoked one pack of cigarettes per day for the past 30 years and adamantly refuses to quit. He also drinks six to ten beers each weekend. His past medical history is significant for type 2 diabetes mellitus and hypertension. His last hemoglobin A1c was 8.3%. He is overweight with a current BMI of 27.5 kg/m<sup>2</sup>. While examining him, you notice a whitish patch over the anterior floor of his mouth. The lesion appears to have a granular texture and is not removed by scraping with a tongue depressor. Which of the following is most likely cause of his oral lesion?

1. ☐ Candidiasis
2. ☒ Leukoplakia
3. ☐ Herpes simplex virus infection
4. ☐ Melanoma
5. ☐ Squamous cell carcinoma

**INCORRECT** ❌

**The correct answer is 2.**

Leukoplakia is a whitish patch or plaque that cannot be clinically or pathologically characterized as any other disease, and is not associated with any physical or chemical causative agent, except the use of tobacco. These are localized, plaque like lesions that have a granular appearance and are hard to remove. Leukoplakia is usually caused by chronic irritation to the oral mucosa due to smoking, alcohol, or ill fitting dentures. These lesions have a risk of transformation into squamous cell carcinoma.

**(Choice 1)** Oral candidiasis occurs in several groups of patients, including those with diabetes. The lesions of candidiasis typically consist of whitish plaques with underlying erythema. In contrast to leukoplakia, the whitish plaques of candidiasis can usually be scraped off with a tongue depressor.

**(Choice 3)** Herpes simplex virus type 1 can cause gingivostomatitis, resulting in the formation of multiple vesicular intraoral lesions that have an erythematous border. They do not cause the whitish plaque seen in this patient

**(Choice 4)** Melanoma should be suspected in any patient who has a pigmented oral lesion with asymmetric borders, enlarging size, and changing color. The lesion described in this patient, however, has none of these features.

**(Choice 5)** This patient has several risk factors for squamous cell carcinoma of the oral cavity, including his extensive use of tobacco and alcohol. As a result, a biopsy of the lesion should be done to exclude cancer.

### 39. Question

**1 points**

A 6-year-old boy is brought to the office by his mother due to a decreased appetite and irritability for the past three days. He also had an episode of diarrhea yesterday. Lately, he has been sitting close to the television with the volume turned up very loudly. His temperature is 38.1°C (100.5°F), blood pressure is 110/60 mmHg, and heart rate is 110/min. On examination, there is left-sided yellowish ear discharge. His nasal mucosa appears boggy and postnasal drip is present. What is the most likely diagnosis?

1. Bullous myringitis
2. Acute otitis media ✓
3. Otitis externa
4. Cholesteatoma
5. Sinusitis

**INCORRECT** ❌

**The correct answer is 2.**

This patient's clinical presentation is most consistent with acute otitis media. Although his decreased appetite, irritability, fever, and diarrhea are nonspecific symptoms seen with a variety of illnesses, they can occur in patients with acute otitis media. The nasal findings are suggestive of either a viral illness or allergic rhinitis, but are also frequently seen in patients with otitis media. However, the left-sided ear drainage and difficulty hearing are highly suggestive of acute otitis media. Ear pain is also a frequent symptom, but is not present in all cases. Diagnosis of acute otitis media should be confirmed with an otoscopic examination, which typically reveals erythema, retraction, or decreased mobility of the tympanic membrane.

**(Choice 1)** Bullous myringitis results from the formation of bullae on the tympanic membrane in some patients with otitis media. Affected patients typically have more severe ear pain than those without bullous myringitis. It is classically associated with *Mycoplasma pneumoniae*.

**(Choice 3)** External otitis may present with hearing loss and ear discharge, but the systemic symptoms seen in this patient are not usually observed unless the infection is severe.

**(Choice 4)** Cholesteatoma can present with hearing loss and ear drainage, but fever and systemic symptoms are not usually present.

**(Choice 5)** Given this patient's boggy nasal mucosa, he is at risk of developing sinusitis. There is no evidence, however, that this patient currently has sinusitis.

#### 40. Question

**1 points**

A 28-year-old female complains of recurrent nasal discharge and increasing nasal congestion. She has a constant sensation of dripping in the back of her throat, and states that food has tasted bland to her recently. She is known to have sickle cell trait. She came to the emergency department for severe wheezing after taking naproxen for menstrual cramping one year ago. She has no history of head trauma. She does not smoke cigarettes, but she admits to smoking marijuana occasionally. Which of the following is the most likely diagnosis?

1. ☐ Angiofibroma
2. ☐ Inverted papilloma
3. ☒ Nasal polyp
4. ☐ Perforated nasal septum
5. ☐ Pyogenic granuloma

**INCORRECT** ❌



**The correct answer is 3.**

This patient's history of wheezing following the ingestion of naproxen as well as her symptoms of rhinitis and post-nasal drainage are highly suggestive of aspirin exacerbated respiratory disease (AERO), a condition commonly associated with the development of nasal polyps. AERO consists of the following features: asthma, chronic rhinosinusitis with nasal polyposis, and bronchospasm or nasal congestion following the ingestion of aspirin or non-steroidal anti-inflammatory drugs (NSAIDS). The diagnosis of AERO can often be made clinically when all three of these conditions are present. This patient's current symptoms of bland tasting food (secondary to anosmia) and recurrent nasal discharge/congestion are typical in patients with nasal polyps, and examination should reveal the presence of bilateral, grey, glistening mucoid masses in her nasal cavities. Although surgery can often provide temporary relief, the polyps tend to recur and ultimate treatment should be geared toward medical management of the underlying etiology.

**(Choice 1)** Juvenile nasal angiofibroma is a rare, benign tumor of the nasopharynx that can cause nasal obstruction and nasal drainage, but also usually results in epistaxis. In addition, it occurs almost exclusively in teenage males.

**(Choice 2)** An inverted papilloma is a tumor of unknown etiology that clinically presents with signs of unilateral nasal obstruction and/or epistaxis. It is not associated with AERO.


**(Choice 4)** Patients with a perforated nasal septum often complain of nasal discomfort and obstruction with excess crusting and bleeding. It is often seen in patients who use intranasal cocaine.

**(Choice 5)** Pregnant women have an increased incidence of pyogenic granulomas on the anterior nasal septum. These highly vascular lesions are frequent sources of nose bleeds during pregnancy.

**41. Question**

**1 points**

A 26-year-old man comes to your office with a one-week history of right-sided ear pain. The pain often wakes him up at night, and increases in severity when he chews food. He cannot recall any recent episodes of pharyngitis. He denies having any ear discharge, sinus tenderness, or skin rash. He exercises by swimming frequently at a local club. He is sexually active and uses condoms "quite regularly." He lives with his brother, who often comments on his habit of grinding his teeth at night. On examination, his ears are normal with a mild amount of wax. Pain is not elicited by pulling on the pinna. There are no hearing deficits appreciated. Mobility of the tympanic membrane is normal, and the Weber and Rinne test results are within normal limits. What is the most likely diagnosis?

1. Ramsay Hunt syndrome
2. Glossopharyngeal neuralgia
3. Otitis media
4. Temporomandibular joint dysfunction 

5. Otitis externa

**INCORRECT** ✖

**The correct answer is 4.**

The most likely diagnosis in this patient is temporomandibular joint (TMJ) dysfunction. Most patients with TMJ dysfunction have a history of nocturnal teeth grinding, and patients often interpret the pain as coming from the ear due to anatomic proximity. The pain associated with TMJ dysfunction is characteristically worsened with chewing because of the strain that this places on the TMJ joint. Although many patients may have audible clicks or crepitus in the TMJ joint with jaw movement, this is not seen in all patients. A thorough physical examination should be done to exclude other conditions within the ear itself. Radiologic imaging of the TMJ joint is often of limited utility. Initial treatment consists primarily of conservative measures such as a nighttime bite guard, but surgical intervention is sometimes necessary.

**(Choice 1)** Ramsay Hunt syndrome is a form of herpes zoster infection that causes Bell's palsy. In this condition, vesicles are typically seen on the outer ear.

**(Choice 2)** Glossopharyngeal neuralgia is a condition in which patients experience intermittent, severe, stabbing pain in areas innervated by cranial nerves IX and X, which includes the ear. However, this patient's history of worsening pain with chewing makes TMJ dysfunction more likely.

**(Choice 3)** Otitis media can result in ear pain, but it will usually cause erythema and/or limited mobility of the tympanic membrane as well.

**(Choice 5)** Otitis externa usually results in ear discharge and pain with pulling on the pinna, neither of which is seen in this patient.

42. Question

1 points

A 30-year-old school teacher presents with a three-day history of fever, chills, and sore throat. He also complains of difficulty swallowing that started yesterday. He denies any cough, chest pain, or difficulty breathing. He is married and denies any new sexual encounters. His temperature is 39.8°C (102.2°F), blood pressure is 118/76 mmHg, pulse is 102/min, and respirations are 19/min. On examination, his voice is muffled. Enlarged, tender cervical lymph nodes are palpated on the left, and his uvula is deviated to the right. What is the most appropriate treatment for this patient?

1. Throat swabs and oral antibiotics
2. Monospot test and oral antibiotics
3. Emergency laryngoscopy
4. Cricothyroidotomy

5. Needle peritonsillar aspiration ✓

**INCORRECT ✗**

**The correct answer is 5.**

This patient's symptoms are most likely secondary to a peritonsillar abscess. Although the three-day history of fever, chills, and sore throat were most likely secondary to tonsillitis, his muffled or "hot potato voice" and deviation of the uvula suggest that a peritonsillar abscess has developed as a complication of his tonsillitis. Patients with a peritonsillar abscess typically have prominent unilateral lymphadenopathy, as seen in this patient. This condition can be fatal secondary to either airway obstruction or spread of the infection into the parapharyngeal space, which may lead to involvement of the carotid sheath. Initial treatment consists of aspiration of the peritonsillar abscess and initiation of intravenous antibiotics. Surgical intervention may be necessary if the purulent material cannot be removed with aspiration alone.

**(Choice 1)** Throat swabs and oral antibiotics are the usual treatment of tonsillopharyngitis, but this patient's muffled voice and deviation of his uvula suggest that a more complicated infection is present.

**(Choice 2)** This patient's unilateral lymphadenopathy, deviation of his uvula, and muffled voice are not consistent with mononucleosis.

**(Choice 3)** Emergency laryngoscopy is typically required in patients with epiglottitis to ensure adequate protection of the airway. Epiglottitis can present with difficulty swallowing and a muffled voice similar to that seen in this patient, but the unilateral lymphadenopathy and deviation of the uvula are more suggestive of a peritonsillar abscess. In addition, the epiglottitis is located more distal in the airway and is not adjacent to the uvula.

**(Choice 4)** Cricothyroidotomy is used as a last resort in patients who are unable to protect their airway. This patient, however, is not complaining of any difficulty breathing at this time.

43. Question

1 points

A 65-year-old man presents with a 10-year history of impotence and decreased libido. He has a 15-year history of type 2 diabetes mellitus, which is controlled with diet. He denies any cardiac problems, visual changes or symptoms of neuropathy. The genitourinary examination reveals decreased testicular size and absent gynecomastia. The rest of the physical examination is unremarkable. The laboratory report shows:

**Hemoglobin A 1 c:** 5%

**Testosterone:** 2.0 ng/dl (Normal 3 -10 ng/dl)

**LH:** 3 U/L

**FSH:** 4U/L

What is the best next step in the management of this patient?



1. Insulin therapy
2. Angiography of the deep arteries of the penis
3. Doppler ultrasonography of penile blood flow
4. Measure the serum prolactin level ✓
5. Measure the serum estradiol level

**INCORRECT** ✗

**The correct answer is 4.**

Erectile impotence in diabetic patients may be due to multiple reasons, including autonomic neuropathy, medications, functional hypogonadism, and problems with penile circulation. It is thus essential to have a broad differential diagnosis to appropriately include all plausible causes of the patient's symptoms. Functional hypogonadism is characterized by low testosterone and low gonadotrophin (LH and FSH) levels in the presence of a significant systemic illness (e.g., uncontrolled diabetes); the underlying pathology is defective gonadotrophin-releasing hormone (GnRH) secretion. In contrast, primary (testicular) hypogonadism is characterized by elevated serum gonadotrophin levels.

In this case, the patient's diabetes is well-controlled, as evidenced by his normal HbA1c level. At this point, the most likely diagnosis is secondary (central) hypogonadism, which is characterized by hypogonadism, low testosterone levels and inappropriately normal gonadotrophin levels. Measurement of serum prolactin levels is the most important biochemical test to perform in patients with suspected central hypogonadism. Regardless of the cause, high serum prolactin levels inhibit the release of GnRH, thereby resulting in hypogonadism. Prolactin-secreting pituitary tumor is one of the most important causes of elevated prolactin levels.

**(Choice 1)** The patient's normal HbA1c level indicates that his diabetes is well controlled with his current regimen; therefore, insulin treatment is not warranted.

**(Choices 2 & 3)** Duplex Doppler ultrasonography or angiography of the penile deep arteries may be indicated when a vascular etiology of erectile impotence is being suspected. Since the patient's features are more suggestive of central hypogonadism, these tests should not be utilized at this time.

**(Choice 5)** In primary hypogonadism, supranormal serum FSH and LH concentrations stimulate testicular aromatase activity, thereby leading to increased estradiol production.

#### 44. Question

**1 points**

A 20-year-old white female presents with polyuria, polydipsia, weakness and fatigue. Her past medical history is insignificant. She has been smoking a pack of cigarettes daily for the last two years. She drinks alcohol on weekends. She denies the use of any drugs. Her mother is diabetic,

and her father died of a myocardial infarction at the age of 40 years. Her pulse is 74/min, blood pressure is 110/70 mm Hg and temperature is 37.2 C. Laboratory studies show:

**Glucose:** 90 mg/L

**Sodium:** 140 mEq/L

**Potassium:** 2.2 mEq/L

**Bicarbonate:** 42 mEq/L

**Renin activity:** Elevated

**Aldosterone:** Elevated

The urine assay for diuretics is negative, and urine chloride concentration is 60 mEq/L (Normal = 20-250 mEq/L). Based on these findings, what is the most likely diagnosis?

1. Primary hyperaldosteronism
2. Diuretic abuse
3. Bartter's syndrome ✓
4. Surreptitious vomiting
5. Renin-secreting tumor

**INCORRECT ✗**

**The correct answer is 3.**

The differential diagnoses of normotensive patients with hypokalemia and metabolic alkalosis include:

1. Diuretic use
2. Surreptitious vomiting
3. Bartter's syndrome
4. Gitelman's syndrome

In this patient, the most likely diagnosis is Bartter's syndrome. Classic Bartter's syndrome usually presents early in life as polyuria, polydipsia, and growth and mental retardation; however, such presentation can occur much later. The underlying pathology is defective sodium and chloride reabsorption in the thick ascending limb of the loop of Henle, thereby resulting in hypovolemia and consequent activation of the renin-angiotensin aldosterone system (RAAS). Activated RAAS then causes an increase in potassium and hydrogen ion secretion, which eventually leads to hypokalemia and metabolic alkalosis.

**(Choices 1 & 5)** Primary hyperaldosteronism and renin-secreting tumors are characterized by hypertension, metabolic alkalosis and hypokalemia. Measurement of the plasma renin activity (PRA) and plasma aldosterone levels (PA) may be used to distinguish between these two diagnoses. In primary hyperaldosteronism, PRA is suppressed and PA is elevated; whereas, in renin-secreting tumors, both PRA and PA are elevated.

**(Choice 2)** The most common cause of hypokalemia seen in clinical practice is the use of diuretics. It may be very difficult to differentiate this diagnosis from Bartter's syndrome, especially if there is no documented diuretic use in the patient's medical records. If diuretic

abuse is strongly suspected, measurement of the urine diuretic level can be performed.

**(Choice 4)** In patients with surreptitious vomiting, characteristic physical findings (e.g., scars/calluses on the dorsum of the hands, dental erosions) may be present. Scars occur as a result of repeated injury to the hand as the patient induces vomiting, and dental erosions result from exposure to gastric acid. Patients also have low urine chloride concentration due to hypovolemia and hypochloremia.

#### 45. Question

1 points

A 15-year-old female is brought to the emergency department with confusion, rapid breathing and abdominal pain. She had been in her usual state of health until three days ago, when she developed runny nose, dry cough and fever. She subsequently developed urinary frequency, progressive fatigue, and somnolence. On physical examination, her mucous membranes are dry and there is abdominal tenderness without rebound. Laboratory findings are given below.

**Hematocrit:** 42%


**WBC count:** 13,000/mm<sup>3</sup>

**Sodium:** 145 mEq/l

**Potassium:** 5.7 mEq/l

**Bicarbonate:** 9 mEq/l

Which of the following is most likely decreased in this patient?

1. Liver glucose production
2. Blood renin activity
3. Circulating free fatty acids
4. Total body potassium stores 
5. Urine solute excretion

**INCORRECT** 

**The correct answer is 4.**

This teenager presents with dry mucous membranes, polyuria, decreased level of consciousness, diffuse abdominal pain, and metabolic acidosis (low bicarbonate) in the setting of an acute upper respiratory infection. The most likely explanation for these findings is diabetic ketoacidosis (DKA) in a patient with undiagnosed type 1 diabetes.

In patients with diabetes, infection can precipitate DKA. This is because infections cause systemic release of insulin counterregulatory hormones like catecholamines and cortisol.

The resultant relative excess of glucagon causes hyperglycemia, ketonemia, and an osmotic diuresis. This diuresis is accompanied by a net renal loss of total body potassium (K<sup>+</sup>)



stores. Despite this reduction in K<sup>+</sup> stores, however, the serum K<sup>+</sup> concentration may actually be elevated, as acidemia and decreased insulin activity cause K<sup>+</sup> to be redistributed to the extracellular fluid compartment. Thus, this patient most likely has a total body K<sup>+</sup> deficit despite her hyperkalemia. The mild leukocytosis is consistent with infection and/or OKA.

**(Choice 1)** Hepatic gluconeogenesis would be increased in this patient, both because of the increased ratio of circulating glucagon to insulin and because of the increased circulating levels of catecholamines and cortisol.

**(Choice 2)** OKA causes an osmotic diuresis and a reduction in the effective circulating blood volume. This activates the renin-angiotensin-aldosterone axis and accelerates renal potassium losses.


**(Choice 3)** OKA is characterized by increased circulating free fatty acids due to an underlying relative excess of glucagon to insulin and a consequent increase in lipolysis.

**(Choice 5)** Hyperglycemia and hyperketonemia in OKA cause osmotic diuresis and increased urinary excretion of glucose, ketones, Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>++</sup>, and phosphate.

#### 46. Question

1 points

A 48-year-old male is referred to you for sexual problems. He has been having problems with attaining erections for the past six months. Prior to the development of this problem, he had an active and satisfactory sexual life. He denies any other medical symptoms and is not on any medication. His marital life is strained due to frequent verbal arguments with his wife. He denies the use of any illicit drugs or alcohol. His vital signs are normal. Physical examination is insignificant, except for obesity. Which of the following diagnostic tests would be most helpful in this patient?

1. Thyroid profile
2. Blood sugar levels
3. 24-hour urine cortisol
4. Nocturnal penile tumescence 
5. CT scan brain

**INCORRECT** 

**The correct answer is 4.**

In patients with erectile dysfunction (ED), it is important to determine whether the underlying cause is psychogenic or organic. Normal eugonadal men experience spontaneous erections during REM sleep and on waking up. Normal nocturnal and early morning erections indicate intact vascular and nerve supplies to the penis; therefore, a history of nocturnal or early morning erections should be asked routinely in patients with ED. Documentation of nocturnal

penile tumescence helps in differentiating organic from psychogenic causes. Since nocturnal penile tumescence is involuntary, it is preserved in patients with psychogenic causes, and absent in patients with organic causes. Sleep studies can be performed to check for nocturnal penile tumescence; however, these are expensive and time-consuming. Devices such as RigiScan obviate the need for doing a whole sleep study, and provide very reproducible information about nocturnal penile tumescence.

In this case, it is very likely that the patient has developed erectile dysfunction (ED) due to a psychological cause (i.e., marital discord); however, information on whether he has nocturnal erections is lacking. Nocturnal penile tumescence testing is therefore the best next step in his management.

**(Choice 1)** Measurement of TSH, prolactin and testosterone levels is typically performed for evaluating organic hormonal causes of erectile dysfunction. Both hypothyroidism and hyperthyroidism can lead to erectile dysfunction. In this patient, a thyroid profile should still be performed even if he denies any medical symptoms; however, since the question is asking for the most helpful test, nocturnal penile tumescence test remains as the best answer.

**(Choice 2)** Autonomic dysfunction from diabetes mellitus can lead to erectile dysfunction; however, the patient denies any other symptoms, and clearly acknowledges a strained relationship with his wife, which is the more likely cause of his symptoms.


**(Choice 3)** The 24-hour urine free cortisol level is helpful in diagnosing Cushing syndrome, which can cause male erectile dysfunction via multiple mechanisms. Screening for Cushing syndrome is not performed unless it is suspected clinically. Since this patient does not have any clinical features that are suggestive of Cushing's syndrome, measurement of 24-hour urinary free cortisol is not warranted.

**(Choice 5)** CT is warranted when a particular neurological disorder (e.g., prolactinoma, stroke, multiple sclerosis) is suspected as the underlying cause of the erectile dysfunction. This patient's medical history and physical examination give no indication for the presence of any neurological disorder.

#### 47. Question

1 points

A 32-year-old male presents to the office with complaints of impotence and absent morning erections. Two months ago, he was involved in a car accident, from which he obtained a pelvic fracture with urethral injury; early realignment of the urethral tear was performed. He is currently not taking any medications. He does not smoke or consume alcohol. What is the most probable cause of this patient's condition?

1. Venogenic
2. Endocrinologic
3. Neurogenic 

- 4. Systemic
- 5. Situational

**INCORRECT** ✖

**The correct answer is 3.**

Penile erections normally occur during REM sleep and on waking up. To achieve an erection, intact nerves and blood supplies are essential. Failure to achieve a spontaneous erection during the night and/or early morning is pathognomonic of organic erectile dysfunction (ED). ED is a very common complication in patients with a pelvic fracture and urethral injury. The incidence of ED is as high as 30% in patients requiring catheter placement only, and can reach as high as 70% in those undergoing open reduction. The cause of impotence in these situations is most probably injury of the parasympathetic nerve fibers; however, recent studies indicate that arterial insufficiency may be a contributing factor.

**(Choice 1)** Venogenic ED may develop after disruption of the tunica albuginea (e.g., penile fracture).

**(Choices Band D)** Endocrinologic causes of ED include hyperprolactinemia and testosterone deficiency. Diabetes mellitus causes ED through several complications (e.g., vascular, neural, etc.), not by the deficiency of any hormone per se; therefore, it can be considered as a systemic cause.

**(Choice 5)** Situational ED is a variant of psychogenic ED, occurring only during certain situations which cause anxiety. Nighttime and morning erections are preserved in patients with situational ED.

#### 48. Question

**1 points**

A 33-year-old Caucasian female presents with complaints of polyuria and polydipsia of recent onset. She prefers cold beverages to quench her thirst. Her pulse is 85/min, blood pressure is 110/70 mm Hg, and respirations are 15/minute. She is afebrile. The lab results are:

**Hb:** 14 g/dl

**WBC:** 6,000/cm<sup>2</sup>

**Platelets:** 280,000/cm<sup>2</sup>

**Blood glucose:** 110 mg/dl

**Serum Na:** 145 mEq/L

**Serum K:** 4.1 mEq/L

**Bicarbonate:** 26 mEq/L

**BUN:** 17 mg/dl

**Serum creatinine:** 1.0 mg/dl


**Serum uric acid:** 10 mg/dl

**Serum osmolality:** 302 mOsm/kg

**Urine osmolality:** 180 mOsm/kg



Which of the following is most consistent with this patient's findings?

1. ☐ Primary polydipsia
2. ☐ Primary aldosteronism
3. ☐ Osmotic diuresis
4. ☐ SIADH
5. ☒ Diabetes insipidus 

**INCORRECT** 

**The correct answer is 5.**

This patient has polyuria, polydipsia and normal blood glucose levels. The major causes of polyuria and polydipsia in non-hospitalized patients are diabetes mellitus, diabetes insipidus (DI) and primary polydipsia (previously called as psychogenic polydipsia). The most likely diagnosis of this patient is DI. DI is characterized by defective ADH production due to hypothalamic-pituitary disorders (central diabetes insipidus) or resistance to ADH action on the renal tubules. Increased serum osmolality normally results in very high values of urine osmolality. Patients with DI, on the other hand, typically have dilute urine in the presence of increased plasma osmolality (as seen in this case). For unclear reasons, patients prefer cold beverages.

**(Choice 1)** Primary polydipsia is caused by excessive water drinking. Patients typically have low plasma and urine osmolality.

**(Choice 2)** Primary hyperaldosteronism causes polyuria due to ADH resistance resulting from hypokalemia. In primary aldosteronism (aldosterone=saves sodium and loses potassium), hypernatremia is rarely symptomatic. Other features include hypertension and hypokalemia.

**(Choice 3)** Osmotic diuresis occurs in patients with hyperglycemia, glucosuria and mannitol administration. In cases with osmotic diuresis, both urine and serum osmolality are elevated; however, urine osmolality is greater than serum osmolality.

**(Choice 4)** Polyuria and polydipsia are not features of SIADH. Furthermore, SIADH results in hyponatremia, low serum osmolality and inappropriately high urine osmolality.

## 49. Question

**1 points**

A 50-year-old male presents with polyuria and polydipsia. He has smoked 1 pack of cigarettes daily for the past 30 years. He denies having any past medical problems. His mother and one maternal uncle are diabetic. His height is 5'8" (172 cm), weight is 180 lbs (81.6 kg), temperature is 37C (98.6F), pulse is 75/min, blood pressure is 150/90 mm Hg, and respirations are 15/min. Examination of all the systems is unremarkable. Chemistry panel shows:

Sodium: 140 mEq/L  
Potassium: 4.1 mEq/L  
Bicarbonate: 26 mEq/L  
Blood glucose: 210 mg/dl  
BUN: 12 mg/dl  
Creatinine: 0.9 mg/dl

The patient is diagnosed with type 2 diabetes mellitus. He is advised exercise and dietary modification. He is referred to an ophthalmologist and appropriately screened for diabetic retinopathy. What is the most sensitive test to screen for nephropathy in this patient?

1. ☐ Creatinine clearance
2. ☐ Dipstick testing of urine for protein
3. ☒ Random urine for micro albumin / creatinine ratio ✓
4. ☐ Renal ultrasound
5. ☐ Oral glucose tolerance test

**INCORRECT** ✗

**The correct answer is 3.**

Development of nephropathy is preceded by development of excessive protein excretion, the initial stages of which is termed microalbuminuria. Patients with microalbuminuria typically have a urine albumin excretion value between 30-300 mg/24 hr. (Normal urine protein excretion is < 30 mg/24 hr). Spot urine collection and timed urine collection for the measurement of urine microalbumin to creatinine ratio are generally accepted as good screening methods for microalbuminuria. Although 24-hour urine collection is slightly more accurate in screening for microalbuminuria, its inconvenience to patients makes it less preferred by physicians.

**(Choice 1)** During the initial phases of diabetic nephropathy, there is glomerular hyperfiltration and an increase in creatinine clearance. Creatinine clearance then declines with the progression of diabetic nephropathy; however, it can still be relatively normal with proteinuria (micro and macroalbuminuria) due to high initial values. Low creatinine clearance occurs when the renal damage is fairly advanced. Due to these reasons, creatinine clearance is not used as a screening tool for diabetic nephropathy.

**(Choice 2)** Routine dipstick testing is not recommended during the initial stages of nephropathy. Dipsticks can only detect excessive urinary protein excretion when the level is > 300 mg/24 hr (macroalbuminuria).

**(Choice 4)** Ultrasound is not useful as a screening tool for diabetic nephropathy. The kidney size is relatively preserved until advanced renal failure occurs. Ultrasound should be considered if non-diabetic renal damage (e.g., obstructive uropathy) is suspected clinically.

**(Choice 5)** Oral glucose tolerance testing has no role in screening patients for diabetic nephropathy.

## 50. Question

1 points

A 45-year-old white female presents with complaints of diffuse body pains and muscle weakness. She was diagnosed with celiac sprue several years ago. She admits to non-compliance with her gluten-free diet. After the appropriate evaluation, she is given a diagnosis of osteomalacia secondary to vitamin D deficiency. She is started on vitamin D, calcium and phosphate, and begins to improve with this treatment. Which of the following is most likely to occur with vitamin D deficiency?

1. ☒ Defective mineralization of bone ✓
2. ☐ Defective mineralization of bone and cartilage
3. ☐ Disordered skeletal remodeling
4. ☐ Defective formation of collagen
5. ☐ Low bone mass with normal mineralization

**INCORRECT** ✗

**The correct answer is 1.**

Osteomalacia is characterized by defective mineralization of the bones. It is seen in adults, occurring after

the epiphyseal growth plates have closed. Vitamin D deficiency leads to decreased availability of calcium and phosphorus at the mineralization sites, resulting in poor mineralization, with consequent softening of the bone and development of deformities, particularly in the weight-bearing bones of the lower extremities.

**(Choice 2)** Rickets is characterized by defective mineralization of both bone and growth plate cartilage. It is also caused by vitamin D deficiency, but is seen only in children.

**(Choice 3)** Disordered skeletal remodeling in focal areas of the bone is the underlying pathophysiology of Paget's disease of the bone. Localized osteoclast activation leads to increased focal bone resorption. In response to increased resorption, osteoblasts lay new bone in the focal resorptive lesions. These focal areas thus acquire a characteristic, disorganized bone structure and loss of normal lamellar structure.

**(Choice 4)** Defective collagen formation is seen in patients with osteogenesis imperfecta. The specifically involved collagen is Type-1 collagen, which is required for the formation of bone, tendon, ligament, skin, and sclera. Osteogenesis imperfecta has a wide variation in phenotype and degree of severity, which is dependent on the type of genetic defects. Mild cases can be missed for long periods of time. Bone density and formation are decreased, whereas bone resorption is increased. Bisphosphonates act by reducing the bone turnover, and have been shown to reduce fractures in children.



**(Choice 5)** Osteoporosis is characterized by low bone mass, but the bone that is present is normally mineralized per unit volume. There is emerging evidence that with low bone mass in osteoporosis, micro architectural deterioration of bone tissue is present. Micro architectural deterioration could be a risk factor for fragility fractures independent of the bone mass.



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